

# NATIONAL

## TAPE RECORDER

### SERVICE MANUAL



## MODEL RQ-152S

### A.C D.C 2 SOURCE TAPE RECORDER

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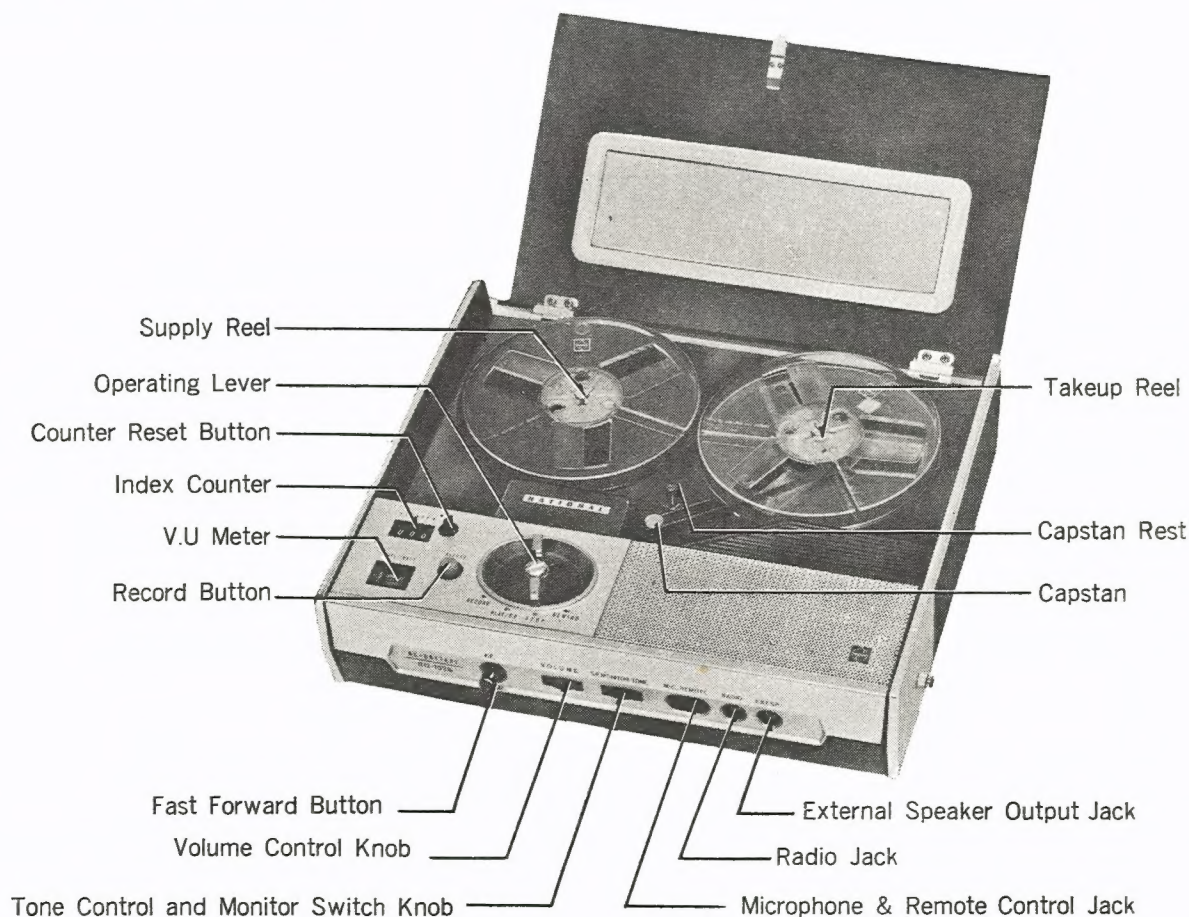
**MATSUSHITA ELECTRIC**

JAPAN

## SPECIFICATIONS

Power Source:	A.C. or Battery Powered A.C. 110V, 220V Battery 9V 6 Batteries
Audio Output:	700 mW (1W maximum)
Transistors:	2SB-173(1) 2SB-175(2) 2SB-178(2) 2SB-172(1)
Recording System:	A.C. Bias 35 K Cycles
Erasure System:	D.C. Erase
Track System:	2 Track System
Monitor System:	Sound Monitor System
Tape Speeds:	3-3/4 i.p.s. and 1-7/8 i.p.s.
Frequency Response:	100~7,000 c/s at 3-3/4 i.p.s. 100~4,000 c/s at 1-7/8 i.p.s.
Input Impedance:	Microphone 20 K $\Omega$ Auxiliary "RADIO" 100 K $\Omega$
Output Impedance:	Extension Speaker Jack "EXT.SP" 8 $\Omega$
Playing Time:	1 hour at 3-3/4 i.p.s. with 5" Tape (600 ft) 2 hour at 1-7/8 i.p.s. with 5" Tape (600 ft)
Battery Life:	More than 30 hours (using NATIONAL "Hi-Top" Batteries)
Recording Level Indicator:	V.U Meter
Built-in Speaker:	3-5/8" Dynamic Speaker
Dimensions:	11-3/4" (W) $\times$ 10" (D) $\times$ 3-1/2" (H)
Weight:	6-3/4 lbs. without Batteries

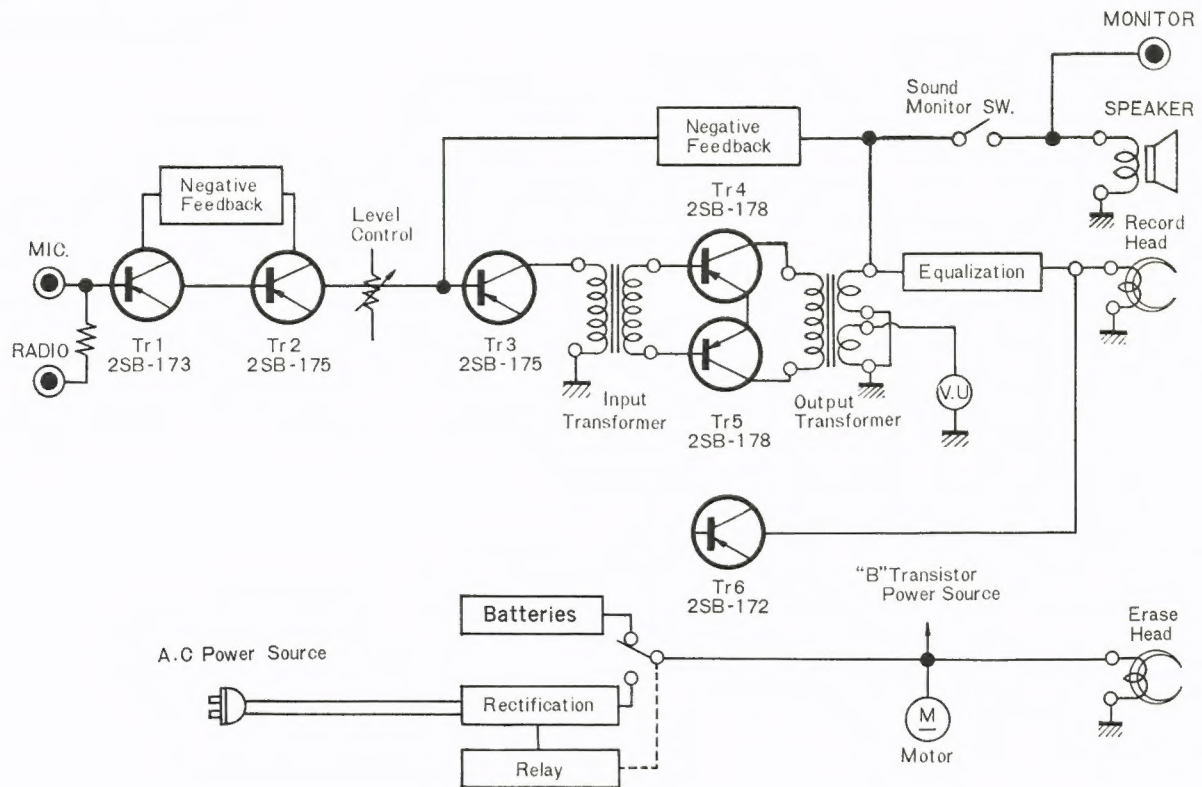
## PARTS LOCATION



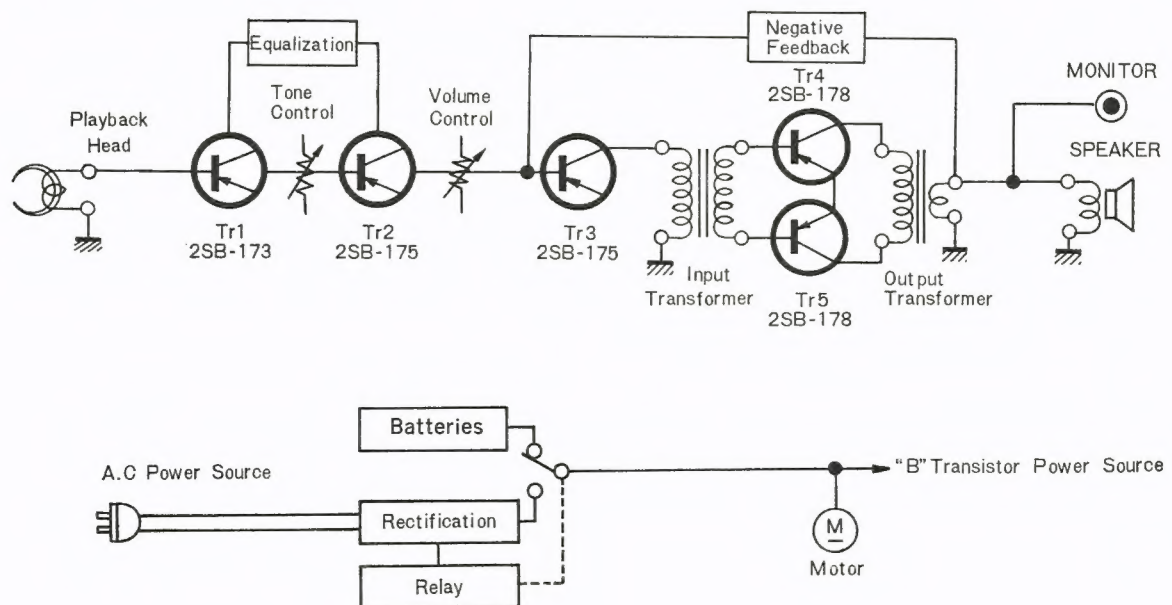


# BLOCK DIAGRAM OF ELECTRICAL CIRCUITS

## RECORDING CIRCUIT

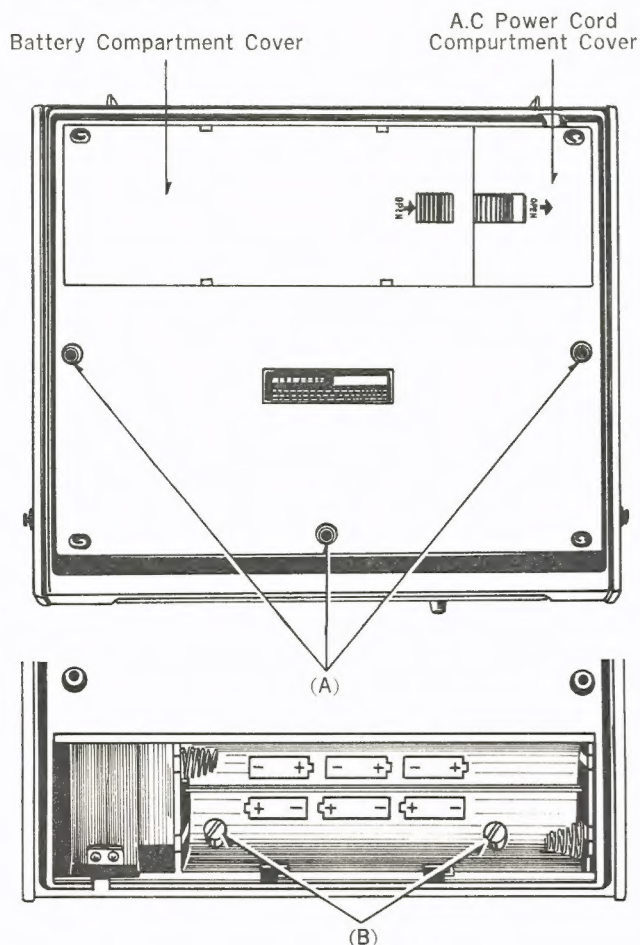


## PLAYBACK CIRCUIT



# DISASSEMBLY INSTRUCTIONS

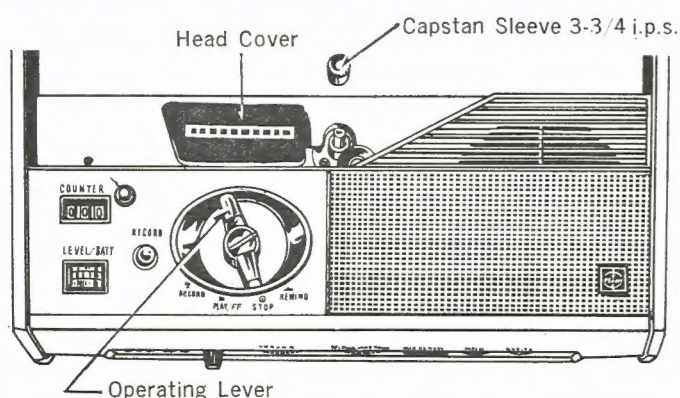
## BOTTOM COVER



1. Turn the set upside down.
2. Undo the fixing screws 3 pcs. (A) of the Bottom Cover and the fixing screws 2 pcs. (B) inside of the Battery Case.
3. If it is lifted from the hinge side, the Bottom Cover can be removed.

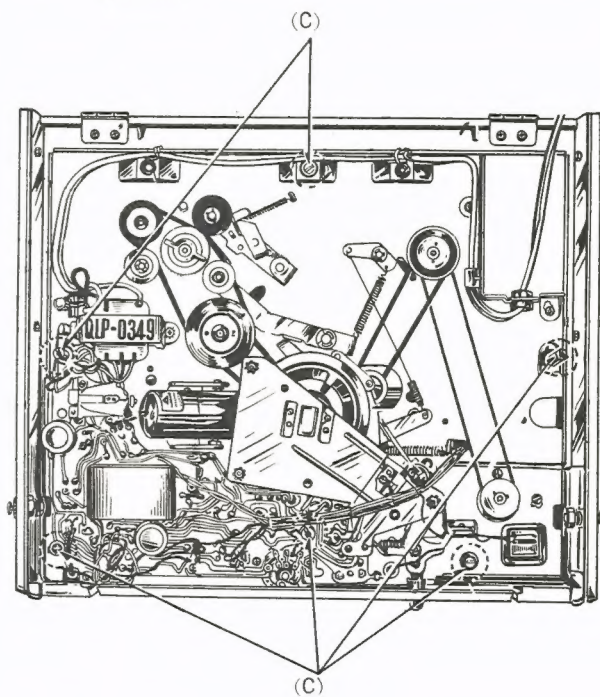
**Note:** Attention must be paid to lead wire from Battery.

## MAIN CABINET BODY CASE

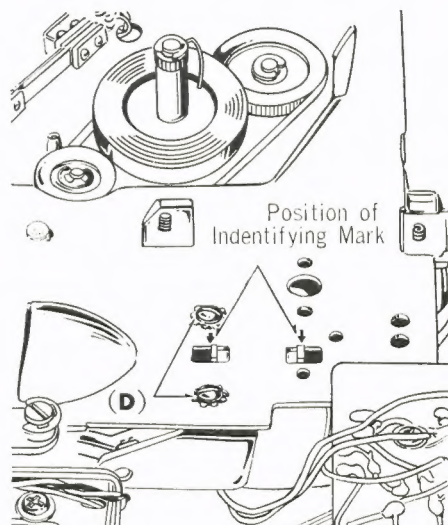


1. Remove the operating Lever and the capstan sleeve 3-3/4 i.p.s.
2. Remove the Bottom Cover.
3. Undo chassis fixing screws 6 pcs. (C).
4. Ho/d the Flywheel of chassis, and pull it up slopewise from Reel Table side.

**Note:** Attention must be paid to lead wire from speaker.



## MOTOR



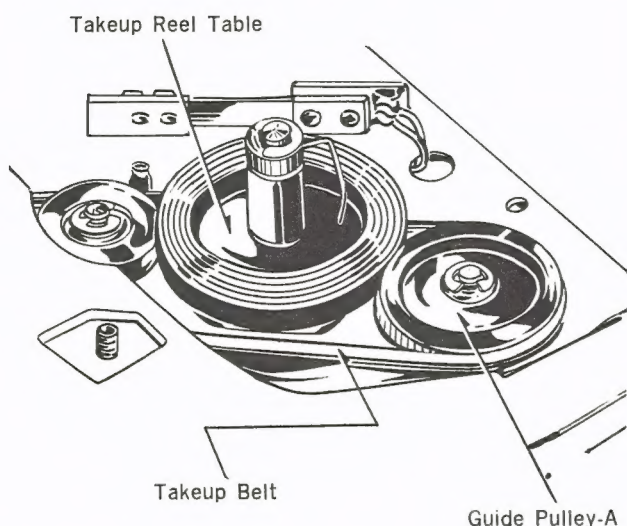
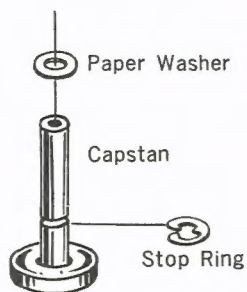
1. Remove the Motor Spring from the Motor.
2. Remove the 3 Motor Lead wires (Yellow, Red and Blue.)
3. Remove 2 screws (D) holding Motor Holder.
4. In doing so mark the original position of the Holder first.

When replacing the Motor, fit it to the position marked. When removing the old Motor, then test the tape speed.

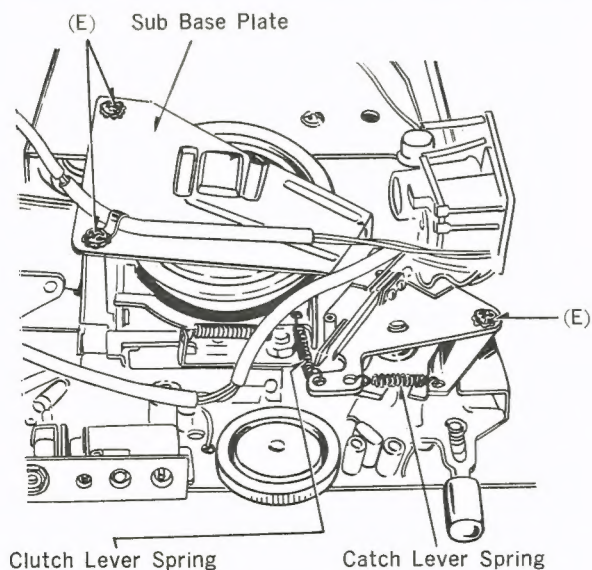


## FLYWHEEL

1. Remove Paper Washer and Stop Ring on the Flywheel Shaft (Capstan).



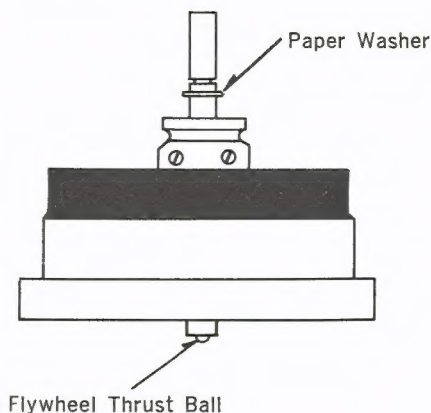
2. Remove the Rubber Belt from the Guide Pulley-A.



3. Remove the Catch Lever Spring and the Clutch Lever Spring.
4. Remove the 3 screws (E) holding the Sub Base Plate.
5. Remove the Sub Base Plate.
6. Pull the Flywheel upward.

When replacing the Flywheel, always install new Flywheel.

Thrust Ball and Paper Washers on the Flywheel Shaft



## MECHANICAL OPERATING CONTROLS

### SINGLE LEVER CONTROL

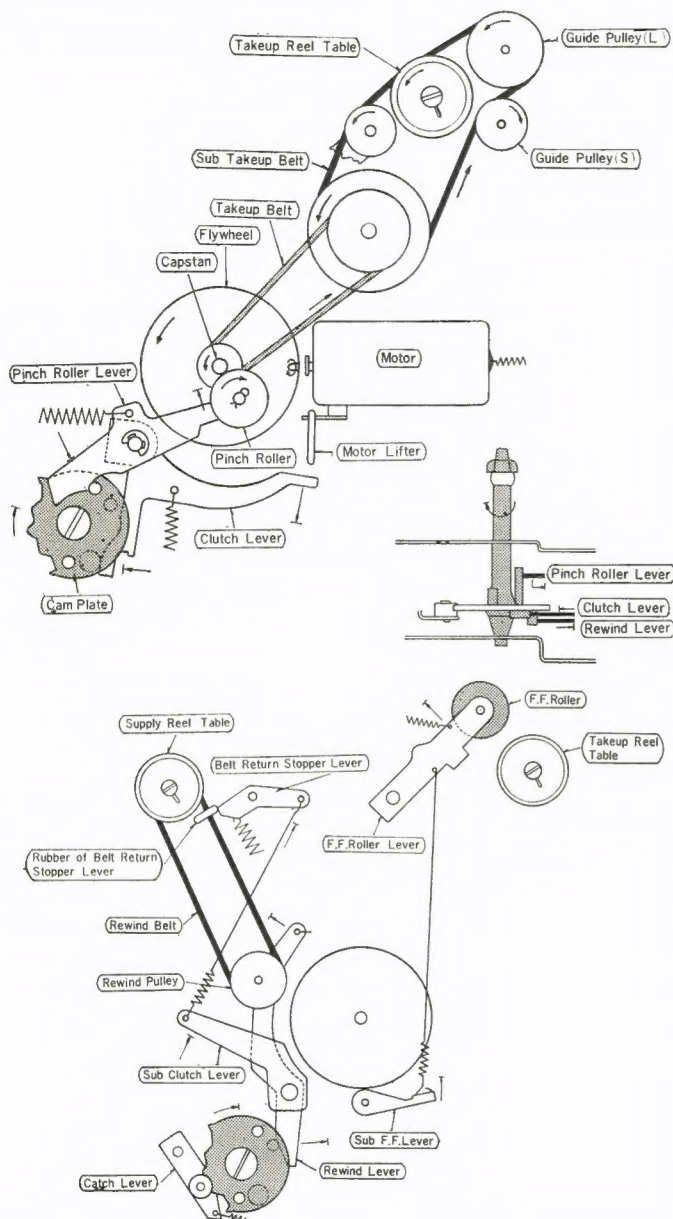
All electrical and mechanical functions are performed by the single, 4 position Operating Lever. The batteries are disconnected in the STOP position.

1. Turning the Operating Lever counter-clockwise to the PLAYBACK position switches the Amplifier ON and actuates the tape transport mechanism to properly Playback a recorded tape.
2. Turning the Operating Lever counter-clockwise to the REWIND position switches the Amplifier OFF and actuates the mechanism to cause transport of the tape onto the supply reel.
3. Pressing the Record/Lock Button and turning the Operating Lever to RECORD actuates the tape transport mechanism and switches the electrical circuits, to enable the signal from the microphone to be recorded. Record/Lock Button is a safety locking device to prevent accidental erasure.
4. Volume Control is used to adjust the recording level and volume of the reproduced sound. It is not connected to the Power Switch.
5. V.U Meter/Battery Voltmeter functions as a dual purpose meter. With the Operating Lever in the RECORD position, the meter functions as a V.U Meter and indicates the recording level. In the PLAYBACK position, the meter functions as a Voltmeter and measures the Voltage output of the batteries.
6. The Model RQ-152S is equipped with a self-contained AC power supply and a unique relay circuit which allows automatic switching from AC to Battery power and vice-versa.  
S4 is the AC to Battery switch contacts and normally is in the Battery position. When AC power is applied, S4 contacts are switched to the AC position by the Relay.



# TAPE TRANSPORT OPERATION

## PLAYBACK

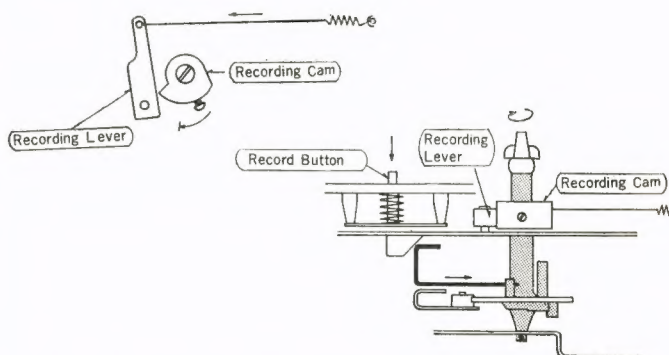


When the operator is adjusted to playback condition by turning the Operating Lever, the following movements occur at one time to feed tape at a constant speed for obtaining playback.

1. Clutch Lever acts, power source is switched on, Motor Lifter is freed from suppression, Motor is pressed on Flywheel, and motor rotation is transmitted to Flywheel.
2. Rotation transmitted to Flywheel turns Takeup Reel Table by Takeup Belt and Sub Takeup Belt.
3. Pinch Roller Lever acts and makes Pinch Roller stuck to Capstan Shaft. With rotation of Capstan Shaft which is conjointly shaft of Flywheel, Pinch Roller is rotated to feed tape at a constant speed.
4. Pinch Roller Lever moves pad arm and Pinch pad to Head.

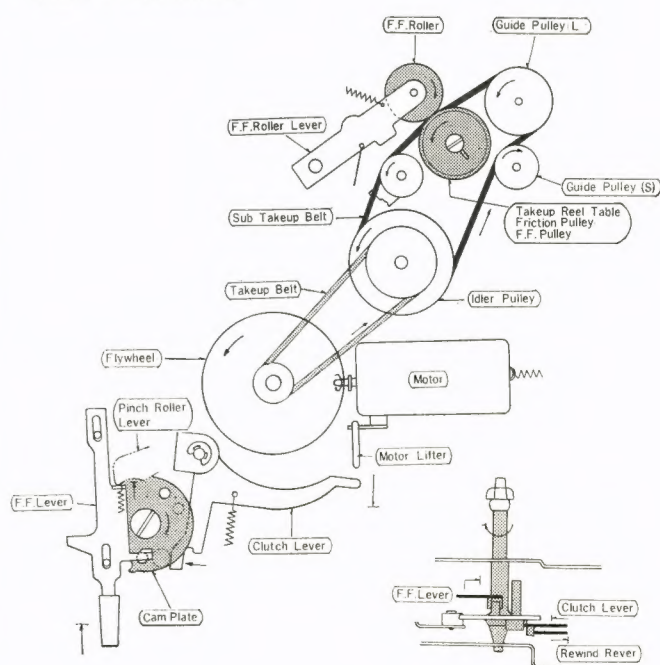
5. Pinch Roller Lever moves Sub F.F. Lever and F.F. Roller Lever, and separates F.F. Roller from Takeup Reel Table.
6. Rewind Lever is actuated, Rewind Pulley is separated from Flywheel, and playback circuit is switched on.
7. Sub Clutch Lever operates, moves Belt Return Stopper Lever and separates rubber of Belt Return Stopper Lever from Supply Reel Table.
8. Catch Lever operates and fixes operator.

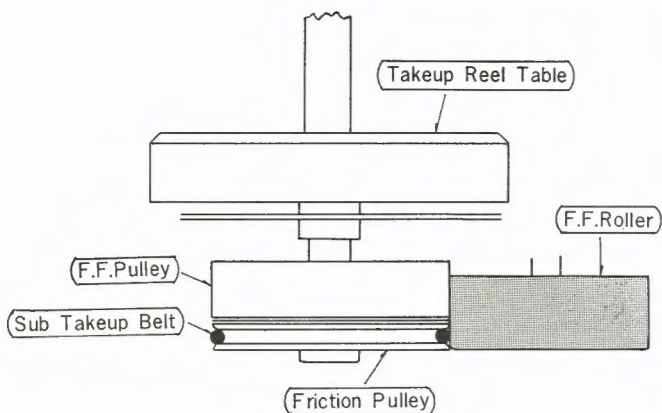
## RECORD



Push the Button for recording, turn the Operating Lever, and adjust the operator to recording position. Then, same operations as in playback begin simultaneously and tape is fed at a constant speed. At the same time, Recording Lever is moved with Recording Cam, Slide Switch is actuated, electric circuit is changed over to recording condition, and thus recording is obtained.

## FAST FORWARD

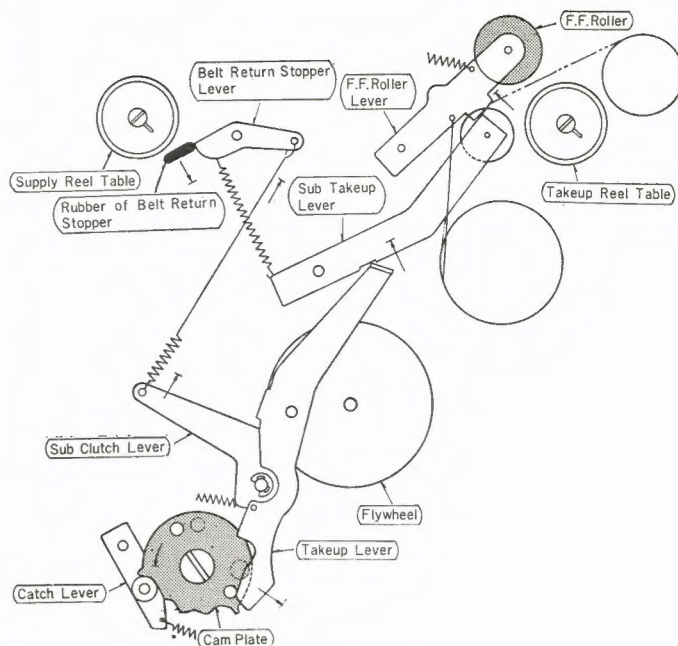
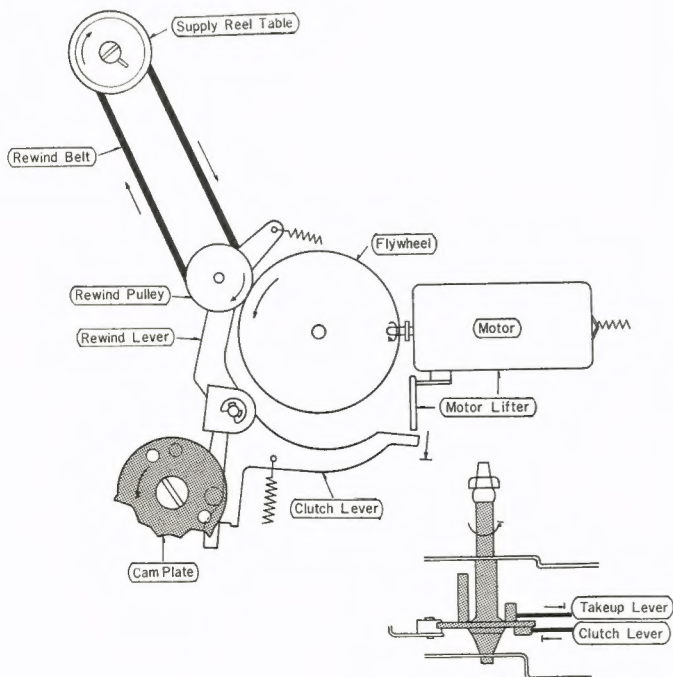




Push the F.F. Button, turn the operating Lever, and adjust the operator to Fast Forward condition. Then the following operations begin simultaneously for F.F. of tape.

1. Clutch Lever operates, power source is switched on, Motor Lifter is freed from suppression, Motor is pressed on Flywheel and motor rotation is transmitted to Flywheel.
2. Rotation transmitted to Flywheel turns Friction Pulley under Takeup Reel Table by Belt, the rotation is transmitted to F.F. Roller and its rotation to F.F. Pulley. As F.F. Pulley is fixed at Takeup Reel Table, the Reel Table quickly rotates.
3. Sub Clutch Lever operates, moves Belt Return Stopper Lever, and separates Rubber of Belt Return Stopper Lever from Supply Reel Table.
4. Catch Lever works and fixes operator.

## REWIND

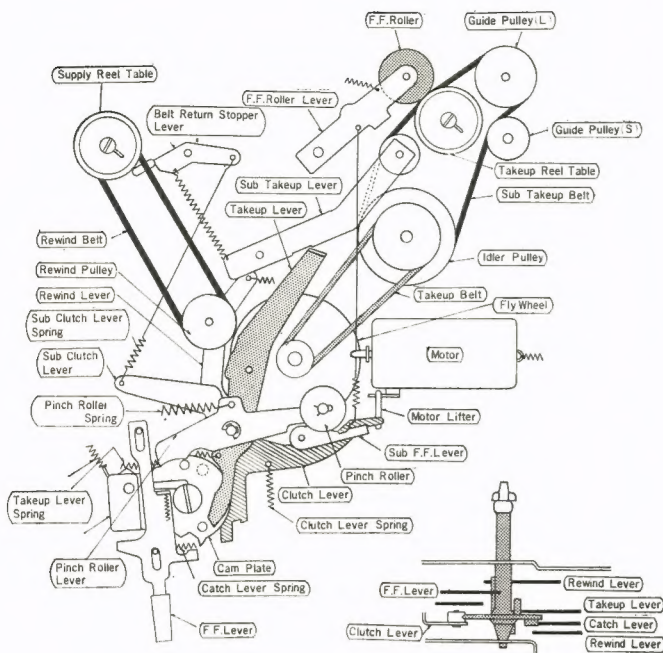


Turn the Operating Lever for putting the operator to rewinding condition. Then the following operations simultaneously occur, and the tape is quickly rewind.

1. Catch Lever operates, power source is switched on, Motor Lifter is freed from suppression, Motor is pressed on Flywheel, and Motor rotation is transmitted to Flywheel.
2. Rotation transmitted to Flywheel is further transmitted to Rewind Pulley which is pressed on Flywheel, and Supply Reel Table is turned to rewinding direction by Rewind Belt.
3. Takeup Lever operates, separates Sub Takeup Lever, F.F. Roller Lever and push F.F. Roller from Takeup Reel Table, putting the Takeup Reel Table in freed condition.
4. Sub Clutch Lever operates, moves Belt Return Stopper Lever, and separates Rubber of Belt Return Stopper Lever from Supply Reel Table.
5. Catch Lever operates and fixes operator.



## STOP



From the status of Record/Playback, quick feed or Rewinding, if the Operating Lever is turned and the operator is adjusted to stopping condition, the following movements occur simultaneously, power source is switched off, and operation come to a stop.

1. Clutch Lever works, power source is switched off, Motor Lifter is suppressed, and Motor is separated from Flywheel.
2. In case of stopping from Record/Playback, Rewind Lever works, circuit for Record/Playback is cut off, and Rewind Pulley is pressed on Flywheel. Pinch Roller Lever works, Pinch Roller is separated from Capstan Shaft, and the Pinch Roller Lever also actuate pad-up for separating pad from bed. By operation of Pinch Roller Lever, Sub F.F. Lever and F.F. Roller Lever are actuated to press F.F. Roller on Takeup Reel Table which serves as a brake. Sub Clutch Lever and Belt Return Stopper Lever work to press Rubber of Belt Return Stopper of Supply Reel Table for braking.
3. In case of stopping from Fast Forward, Rewind Lever works, and Rewind Pulley is pressed on Flywheel. Sub Clutch Lever and Belt Return Stopper Lever work to press Rubber of Belt Return Stopper on Supply Reel Table for braking.
4. In case of stopping from rewinding, Takeup Lever and Sub Takeup Lever work to press F.F. Roller on Pulley of Takeup Reel Table. Braking is effected when F.F. Roller comes in touch with Pulley of Takeup Reel Table.

## MECHANICAL ADJUSTMENTS

### PINCH ROLLER TENSION

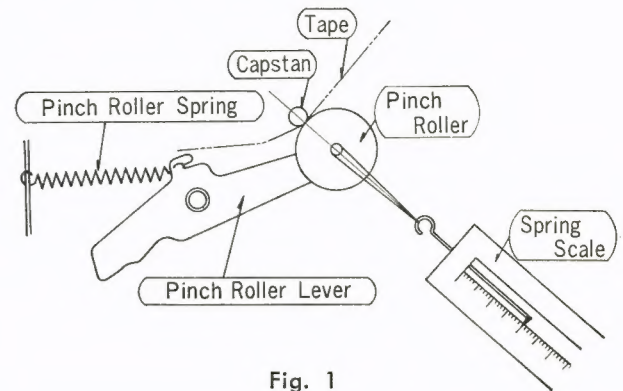


Fig. 1

Instruments Required: Spring Scale; Strong Twine.  
Measurement: Refer to Fig. 1.

1. Load the tape as in the case of Playback, and set the Tape Recorder in Record or Playback mode.
2. Hang a loop of twine on the Pinch Roller Shaft and hook the Spring Scale on the other end of the loop.
3. Pull the Spring Scale in the direction of a line connecting the centers of the Capstan and Pinch Roller Shaft, and increasing the pull slowly read the scale at a point where the tape stops moving by the pull.
4. The standard pressure of the Pinch Roller Shaft should be:
 

1-7/8 ips.....	5.3~7.4 ozs. (150~210 g)
3-3/4 ips.....	5.7~8.5 ozs. (160~240 g)

### ADJUSTMENT

Adjust the Pinch Roller Spring to the standard pressure accordingly.

### TAPE PAD PRESSURE

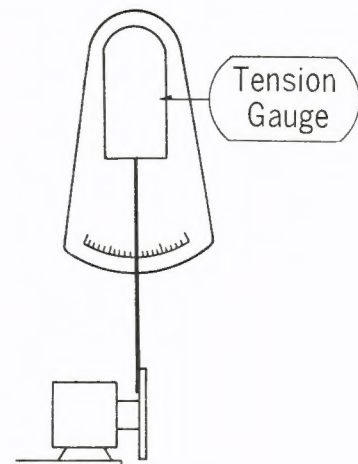


Fig. 2



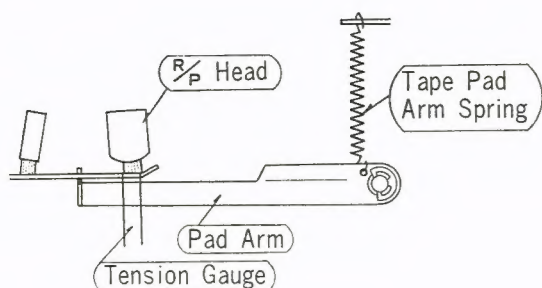


Fig. 3

Instrument Required: Tention Gauge

Measurement: Refer to Fig. 2. and 3.

1. Set the Tape Recorder in Playback mode without loading the tape.
2. Hook the Tension Gauge on the Tape Pad for the Record/Playback Head at the center and lightly pull the gauge so that the pad parts from the head. Take the reading just at the point where the pad parts from the head.
3. The standard pressure of the pad for the Record/Playback Head should be:  
0.2~0.5 ozs. (6~14 g)

## ADJUSTMENT

Adjust the Tape Pad Arm Spring to the standard pressure.

## WINDING TORQUE FOR PLAYBACK AND FAST FORWARD

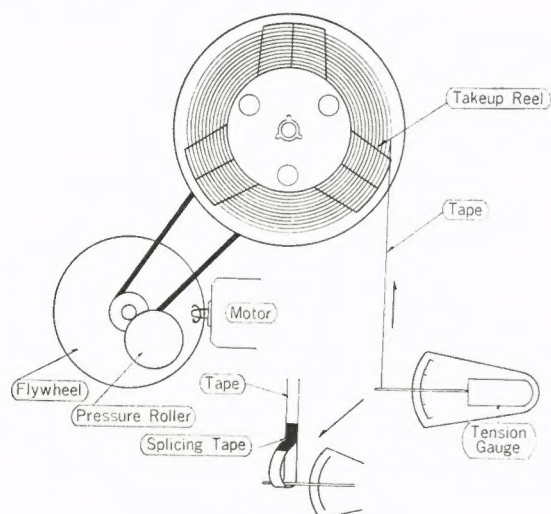


Fig. 4

Instruments Required: Tension Gauge; Splicing Tape

Measurement: Refer to Fig. 4.

1. Make a loop of the tape (5" reel) end, fasten the looped end with the splicing tape, and put the reel on the Takeup Reel Table.
2. Hook the Tension Gauge on the loop and pull out 6 inches or so of the tape end.

3. Set in the Playback or Fast Forward mode, and pull the Tension Gauge in the direction of winding keeping the pace with the moving tape until the reading of the Tension Gauge remains constant at which point take the reading. Repeat this for several times and take the average for a correct torque.
4. The above test should be made with 5" tape reel with full load.
5. The standard torque should be:  
Playback.....0.53~0.71 ozs. (15~20g)  
Fast Forward.....0.71 ozs. ~ (20g~)

## ADJUSTMENT

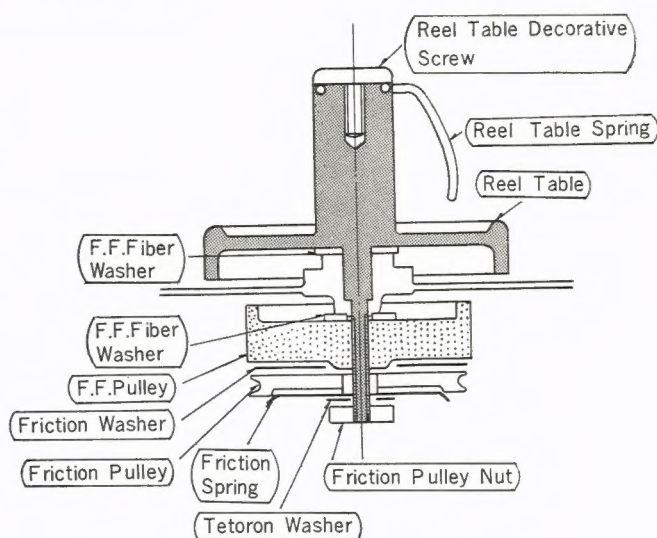


Fig. 5

Adjust the torque with the Friction Spring on the Takeup Reel Table. If the torque is too strong, loosen the Friction Spring, and if too weak tighten it. If the Friction Washer gets oily clean it immediately to prevent slip. If the tension of the Takeup Belt is weakened the winding torque drops.

## BACK-TENSION FOR PLAYBACK

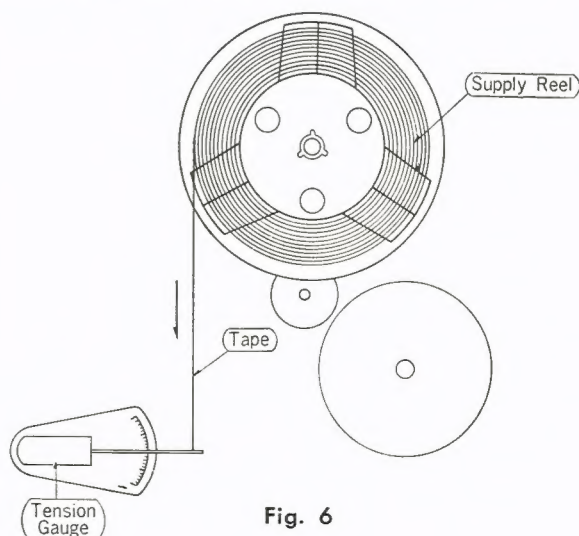


Fig. 6

Instruments Required: Tension Gauge; Splicing Tape  
Measurement: Refer to Fig. 6.

1. Measure the back-tension in the manner similar to the winding torque for Playback, but in this case by pulling the tension gauge on the 5" tape loaded on the Supply Reel Table.
2. Measure the back-tension for Playback with 5" reel fully loaded.
3. The standard back-tension should be:  
0.05~0.25 ozs. (1.5~6.5 g)

## ADJUSTMENT

Too strong back-tension may be caused by the accumulation of dust on the turning parts of the Rewind Pulley and Supply Reel Table, requiring occasional cleaning. Too weak back-tension may be due to the weakened tension of the Rewind Belt and it should preferably be replaced then.

## MOTOR SHAFT PRESSURE AGAINST FLYWHEEL

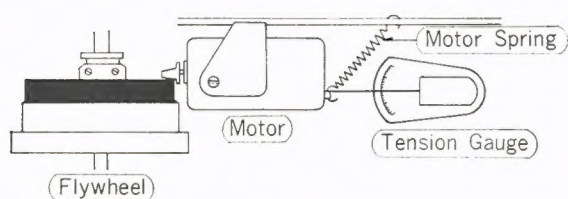


Fig. 7

Instrument Required: Tension Gauge  
Measurement: Refer to Fig. 7.

1. Load the tape and set the Tape Recorder in Playback mode. Hook the Tension Gauge on the end of the Motor Spring attached to the Motor (see the drawing).
2. Pull the Tension Gauge opposite to the action of the spring and increase the pull until the Flywheel and the Motor Pulley part from each other at which point take the reading. The tape stops then.
3. The standard pressure for the Motor:  
2.5~3.5 ozs. (70~100 g)

## ADJUSTMENT

Adjust the motor spring for correct pressure.

## HEAD ADJUSTMENTS

Relative positions of heads and tape,  
Adjust the relative positions of Record/Playback head and Erase head as shown in the drawing.

Improper relative positions of these heads causes imperfect erasure and cross-talk, and the slightest displacement of the mounting may lead to the low position of the head in respect of the tape. Close adjustment is therefore necessary.

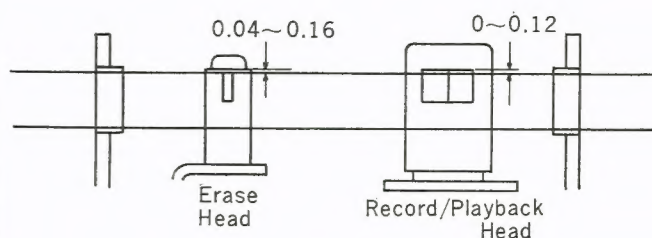


Fig. 8

Unit: Inch

## HEAD AZIMUTH ADJUSTMENT

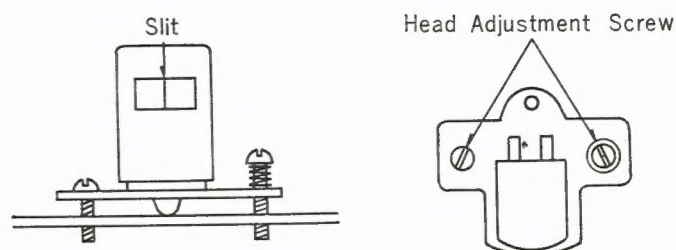


Fig. 9

Deflection of the angle of the head slit from vertical will deteriorate high frequency characteristic on playing back the tape with recording made with another Tape Recorder, while it is not so important with the tape recorded and played back on one and the same Tape Recorder. The higher the deflection, the poorer the performance. To prevent this trouble, the slit of the head should be maintained precisely at right angles to the path of the tape.

Connect the Vacuum Tube Voltage Meter (V.T.V.M.) with 8  $\Omega$  Resistor in parallel to the Monitor Jack, and playback the standard alignment tape (tape with recording of signals, 3,000 cps. at 3-3/4 ips. on vertical slit).

Adjust the angle of the head slit to be precisely vertical by turning the adjusting screws so as to obtain the maximum output signal.

When the Record/Playback Head is replaced it must be adjusted as described above.

## TREATMENT AFTER ADJUSTMENT

Lacquer-lock all the holding and adjusting screws of the heads after the adjustment has been completed.



## AMPLIFIER ADJUSTMENTS

### RECORD BIAS FREQUENCY

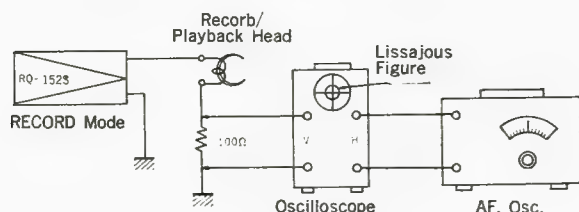


Fig. 10

Instruments Required: Oscilloscope; A.F. Oscillator; 100  $\Omega$  Resistor.

Measuring Circuit: Refer to Fig. 10.

Connect a 100  $\Omega$  Resistor in series to the ground side of the Record/Playback Head, and compare the frequency of voltage at both ends of the resistor with the frequency of the A.F. Oscillator.

To compare, make the oscilloscope form a Lissajou's Figure, and bringing the frequency of the A.F. Oscillator close to 50 kc, watch the point at which the circle of the Lissajou's Figure stands still which is the frequency to be measured. The standard frequency is: 30~40 kc.

If any frequency without the above range occurs, turn slowly the core of the Oscillator Transformer (T3) until the frequency remains within the range, tuning with the frequency of the A.F. Oscillator.

### RECORD BIAS CURRENT

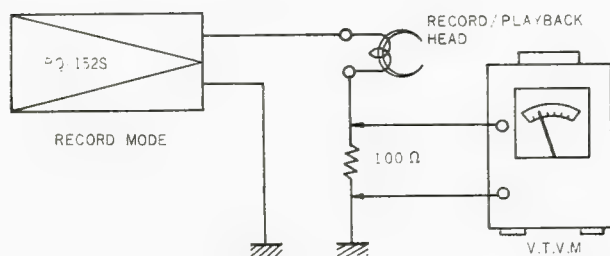


Fig. 11

Instruments Required: V.T.V.M.; 100  $\Omega$  Resistor

Measuring Circuit: Refer to Fig. 11.

After adjusting Record bias frequency, connect the V.T.V.M. to both ends of 100  $\Omega$  Resistor, and confirm if the Record bias current is 0.9~1.1 mA. Voltage at both ends of 100  $\Omega$  Resistor is 0.09~0.11 V.

If the Record bias current is without the above range, correct it by varying the Record bias frequency within the range of 25~35 kc.

When all the measurement is finished the original wiring on the heads should be restored. Care Should be taken to keep correct polarity so as to avoid distortion noise.

### ERASE CURRENT

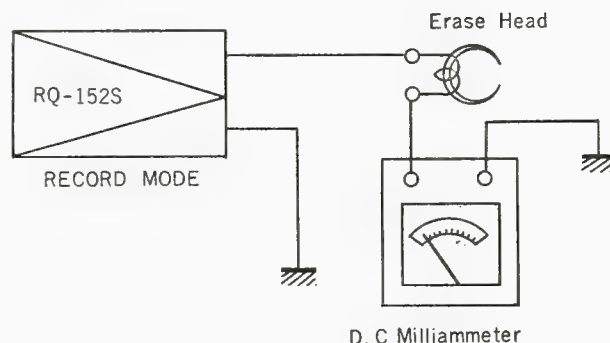


Fig. 12

Instruments Required: D.C. milliammeter

Measuring Circuit: Refer to Fig. 12.

Connect the D.C. milliammeter in series to the ground side of the Erase head.

When the Tape Recorder is set in Record mode, D.C. milliammeter will indicate Erase current. The standard Erase current is between 4~8 mA.

### RECORDING LEVEL

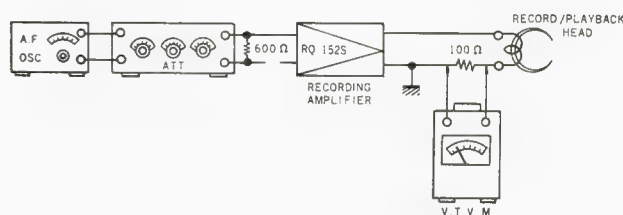


Fig. 13

Instruments Required: A.F. Oscillator; Attenuator; V.T.V.M.; 600  $\Omega$  and 100  $\Omega$  Resistors

Measuring Circuit: Refer to Fig. 13.

Remove the soldered lead wire from No. 3 of the Oscillator Transformer (T3) and stop the bias oscillation.

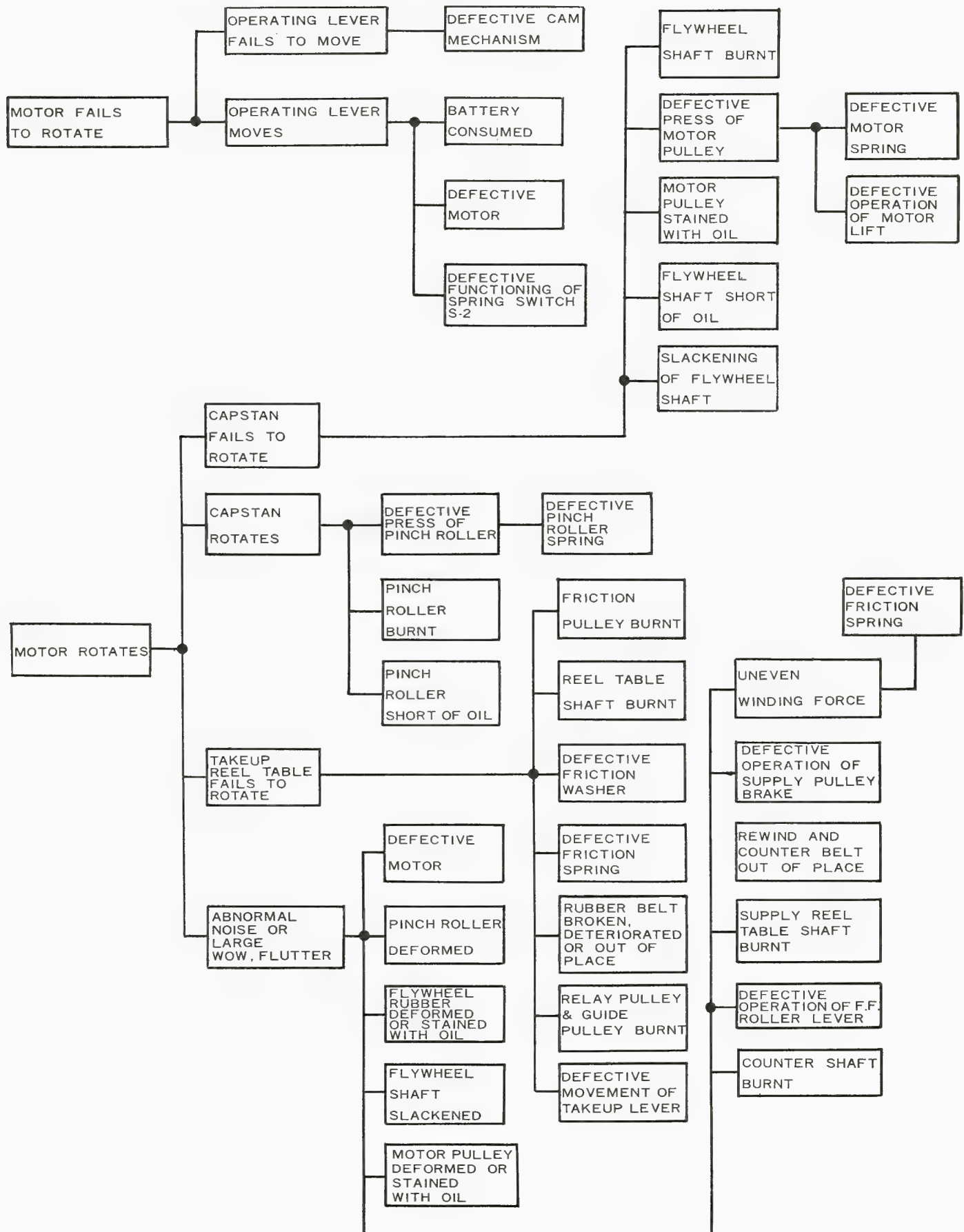
Set the Tape Recorder in Record mode and turn the volume control knob to the maximum.

Measure the recording level necessary to feed 0.05 mA to the Record-head from the input jack.

Connect a 100  $\Omega$  Resistor to the ground side of the Record head, and adjust the attenuator so that the voltage at both ends of the resistor is maintained at 0.05 V, and confirm if its value is -64.5~-74.5 db. Also confirm the indication of the V.U. meter which should be -3~+3 db.

# TROUBLE SHOOTING GUIDE 1.

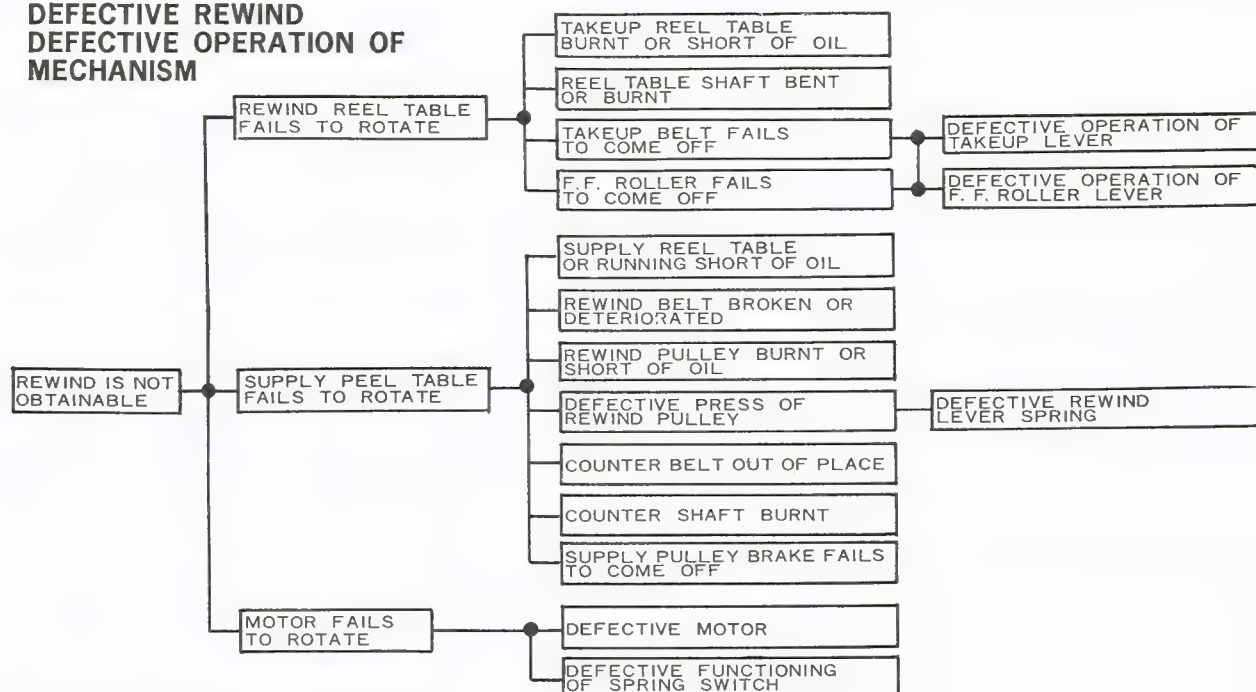
## DEFECTIVE RECORD/PLAYBACK DEFECTIVE OPERATION OF MECHANISM



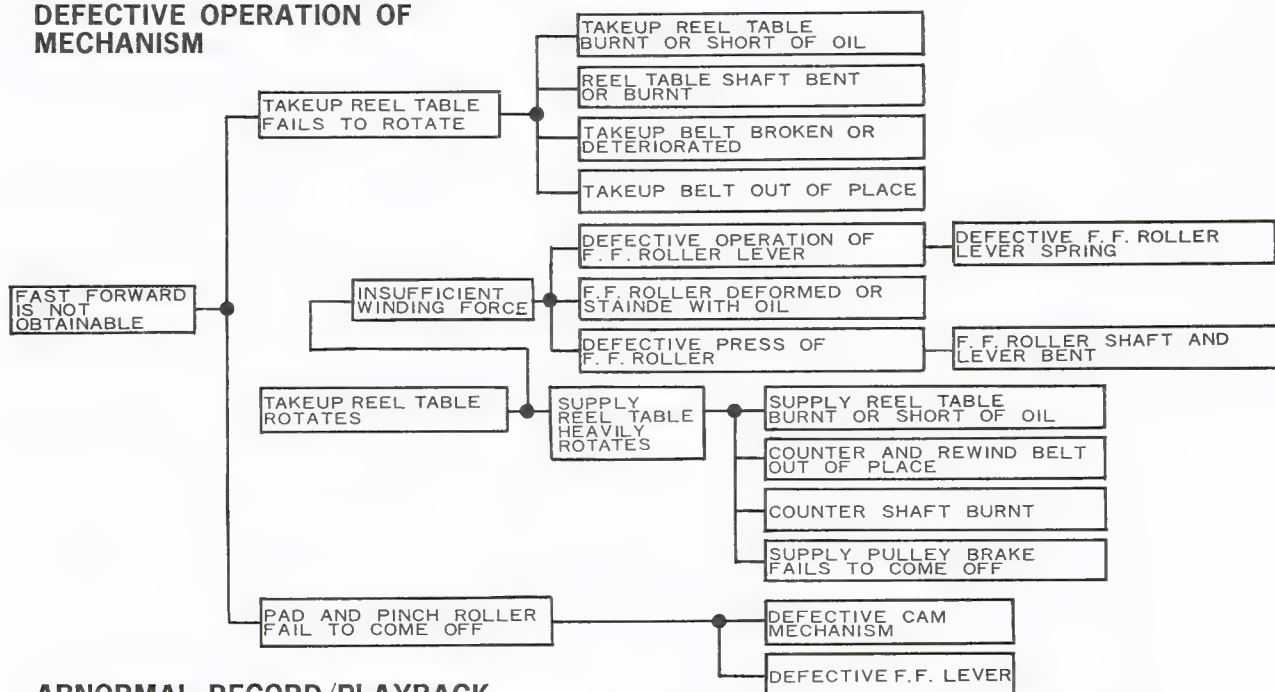


## TROUBLE SHOOTING GUIDE 2.

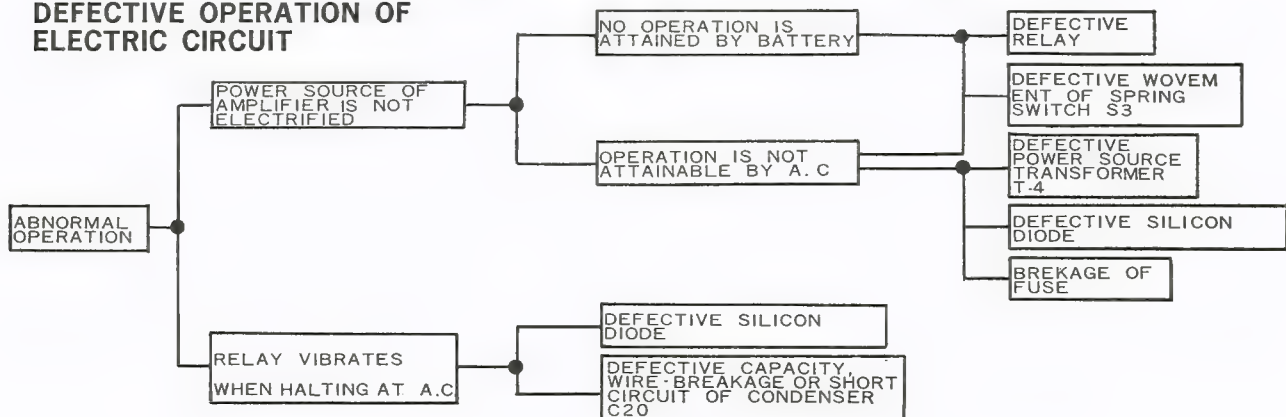
### DEFECTIVE REWIND DEFECTIVE OPERATION OF MECHANISM



### DEFECTIVE FAST FORWARD DEFECTIVE OPERATION OF MECHANISM



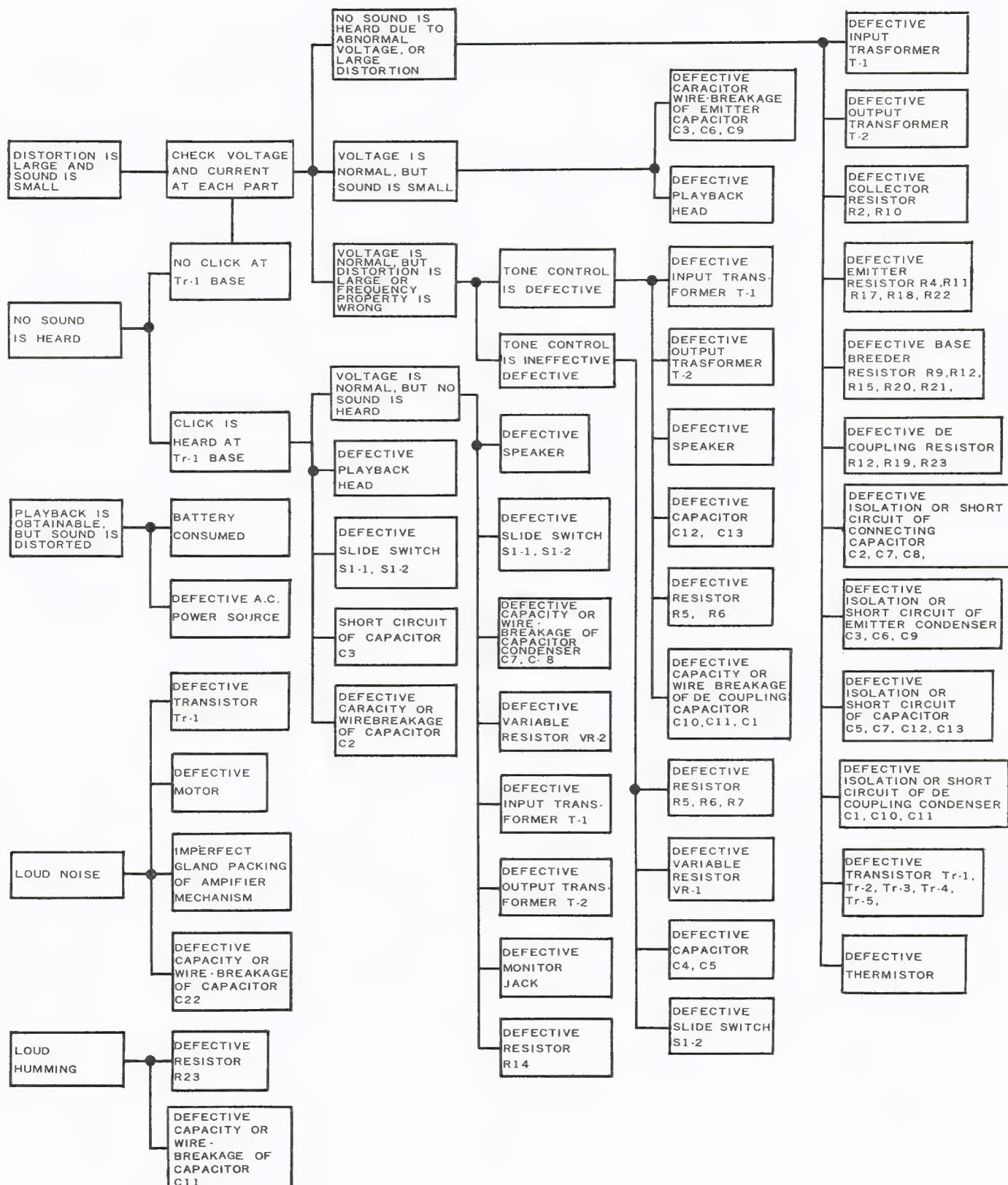
### ABNORMAL RECORD/PLAYBACK DEFECTIVE OPERATION OF ELECTRIC CIRCUIT



## TROUBLE SHOOTING GUIDE 3.

## ABNORMAL PLAYBACK

### DEFECTIVE OPERATION OF ELECTRIC CIRCUIT

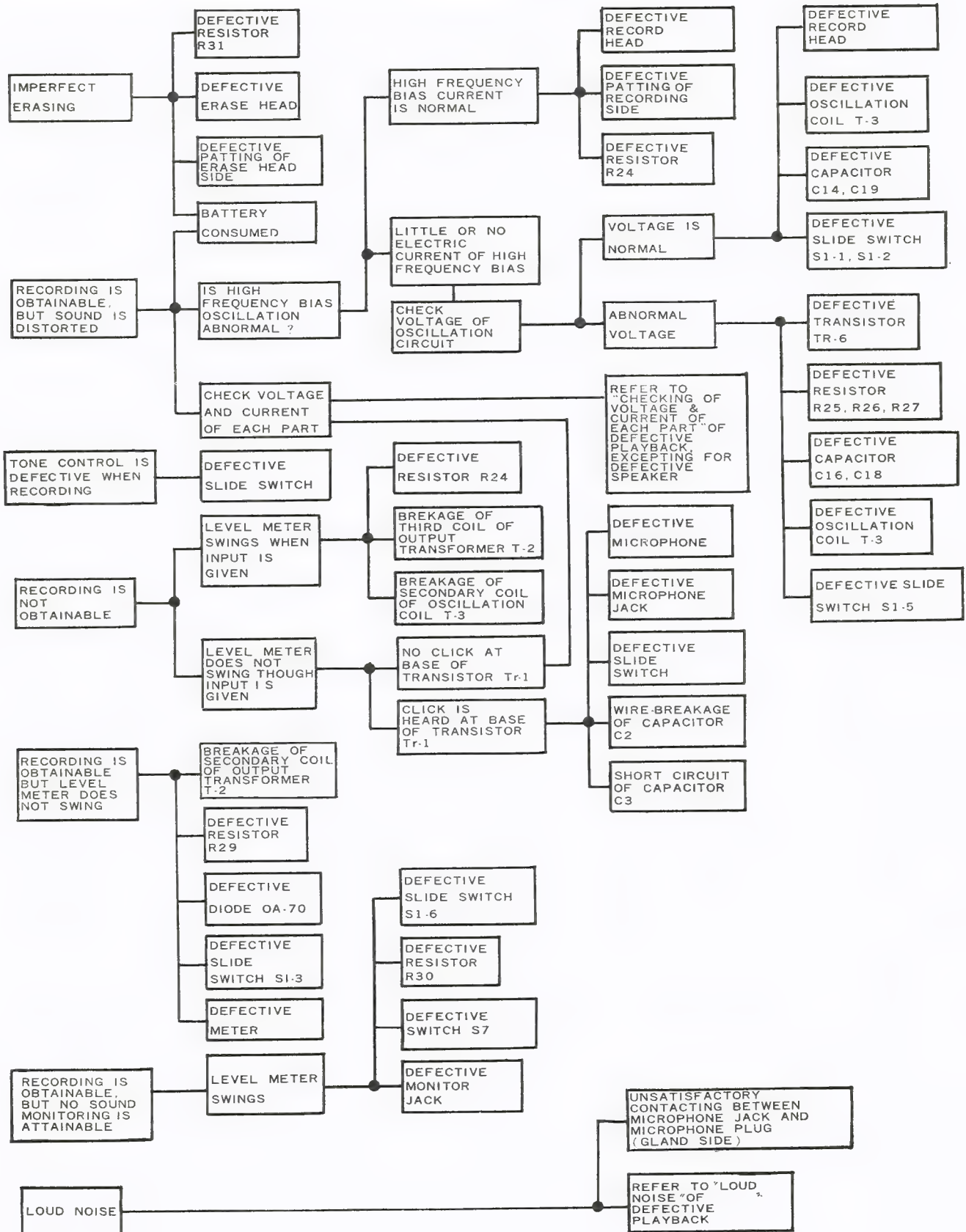




# TROUBLE SHOOTING GUIDE 4.

## ABNORMAL RECORD

### DEFECTIVE OPERATION OF ELECTRIC CIRCUIT



# REPLACEMENT PARTS LIST

**ATTENTION:** Please order Replacement Parts according to this Replacement Parts List. The parts which are not listed up here will not be supplied. So a part in an assembly has to be ordered as a whole assembly.

## RESISTORS

Ref. No.	Description	Parts No.
R 1	Carbon Resistor 22 K $\Omega$ 1/4 Watt 10%	QRD-14TRK223
R 2	Carbon Resistor 10 K $\Omega$ 1/4 Watt 10%	QRD-14TRK103
R 3	Carbon Resistor 120 $\Omega$ 1/4 Watt 10%	QRD-14TRK121
R 4	Carbon Resistor 1.2 K $\Omega$ 1/4 Watt 10%	QRD-14TRK122
R 5	Carbon Resistor 2.2 K $\Omega$ 1/4 Watt 10%	QRD-14TRK222
R 6	Carbon Resistor 1.2 K $\Omega$ 1/4 Watt 10%	QRD-14TRK122
R 7	Carbon Resistor 270 $\Omega$ 1/4 Watt 10%	QRD-14TRK271
R 8	Carbon Resistor 33K $\Omega$ 1/4 Watt 10%	QRD-14TRK333
R 9	Carbon Resistor 100 K $\Omega$ 1/4 Watt 10%	QRD-14TRK104
R 10	Carbon Resistor 2.7 K $\Omega$ 1/4 Watt 10%	QRD-14TRK272
R 11	Carbon Resistor 2.2 K $\Omega$ 1/4 Watt 10%	QRD-14TRK222
R 12	Carbon Resistor 1.2 K $\Omega$ 1/4 Watt 10%	QRD-14TRK122
R 13	Carbon Resistor 33 K $\Omega$ 1/4 Watt 10%	QRD-14TRK333
R 14	Carbon Resistor 560 $\Omega$ 1/4 Watt 10%	QRD-14TRK561
R 15	Carbon Resistor 10 K $\Omega$ 1/4 Watt 10%	QRD-14TRK103
R 16	Carbon Resistor 820 $\Omega$ 1/4 Watt 10%	QRD-14TRK821
R 17	Carbon Resistor 330 $\Omega$ 1/4 Watt 10%	QRD-14TRK331
R 18	Carbon Resistor 10 $\Omega$ 1/4 Watt 10%	QRD-14TRK100
R 19	Carbon Resistor 270 $\Omega$ 1/4 Watt 10%	QRD-14TRK271
R 20	Carbon Resistor 1.5 K $\Omega$ 1/4 Watt 10%	QRD-14TRK152
R 21	Carbon Resistor 100 $\Omega$ 1/4 Watt 10%	QRD-14TRK101
R 22	Carbon Resistor 2.2 $\Omega$ 1/4 Watt 10%	QRD-14TRK222
R 23	Carbon Resistor 47 $\Omega$ 1/4 Watt 10%	QRD-14TRK470
R 24	Carbon Resistor 100 K $\Omega$ 1/4 Watt 10%	QRD-14TRK104
R 25	Carbon Resistor 4.7 $\Omega$ 1/4 Watt 10%	QRD-14TRK4R7
R 26	Carbon Resistor 10 K $\Omega$ 1/4 Watt 10%	QRD-14TRK103
R 27	Carbon Resistor 47 K $\Omega$ 1/4 Watt 10%	QRD-14TRK473
R 28	Carbon Resistor 25 K $\Omega$ 1/4 Watt 5%	QRD-14TRJ253
R 29	Carbon Resistor 270 $\Omega$ 1/4 Watt 10%	QRD-14TRK271
R 30	Carbon Resistor 10 $\Omega$ 1/2 Watt 10%	QRD-12TRK100
R 31	Carbon Resistor 560 $\Omega$ 1/4 Watt 10%	QRD-14TRK561
R 32	Carbon Resistor 270 $\Omega$ 1/4 Watt 10%	QRD-14TRK271
R 33	Carbon Resistor 100 K $\Omega$ 1/4 Watt 10%	QRD-14TRK104

## CAPACITORS

C 1	Electrolytic Capacitor 50 $\mu$ F WV 10V	QCE-A10V50
C 2	Electrolytic Capacitor 1 $\mu$ F WV 10V	QCE-A10V1
C 3	Electrolytic Capacitor 30 $\mu$ F WV 6V	QCE-A6V30
C 4	Polystyrene Capacitor 0.1 $\mu$ F	QCQ-K05104M
C 5	Polystyrene Capacitor 0.05 $\mu$ F	QCQ-K05503M
C 6	Electrolytic Capacitor 30 $\mu$ F WV 6V	QCE-A6V30
C 7	Electrolytic Capacitor 10 $\mu$ F WV 10V	QCE-A10V10
C 8	Electrolytic Capacitor 0.5 $\mu$ F WV 10V	QCE-A10V0R5
C 9	Electrolytic Capacitor 50 $\mu$ F WV 6V	QCE-A6V50
C 10	Electrolytic Capacitor 50 $\mu$ F WV 10V	QCE-A10V50
C 11	Electrolytic Capacitor 500 $\mu$ F WV 12V	QCE-A12V500
C 12	Polystyrene Capacitor 0.01 $\mu$ F	QCQ-K05103M



Ref. No.	Description	Parts No.
C 13	Polystyrene Capacitor 0.01 $\mu$ F	QCQ-K05103M
C 14	Polystyrene Capacitor 0.001 $\mu$ F	QCQ-K05102M
C 15	Electrolytic Capacitor 500 $\mu$ F WV 12V	QCE-A12V500
C 16	Electrolytic Capacitor 3 $\mu$ F WV 12V	QCE-A12V3
C 18	Polystyrene Capacitor 0.01 $\mu$ F	QCQ-K05103M
C 19	Polystyrene Capacitor 3900 PF	QCQ-K05392M
C 21	Polystyrene Capacitor 820 PF	QCQ-K05821M
C 22	Electrolytic Capacitor 100 $\mu$ F WV 10V	QCE-A10V100

## TRANSISTORS

Ref. No.	Description	Parts No.
Tr 1	Transistor	2SB 173
Tr 2	Transistor	2SB 175
Tr 3	Transistor	2SB 175
Tr 4	Transistor	2SB 178
Tr 5	Transistor	2SB 178
Tr 6	Transistor	2SB 172

## VARIABLE RESISTORS

VR 1	Variable Resistor 10 K $\Omega$	QVVR-600A10KC
VR 2	Variable Resistor 10 K $\Omega$	QVVR-1606G10KC

## DIODES

D 1	Silicon Diode	FR-1A
D 2	Silicon Diode	FR-1A
D 3	Diode	OA-70

## TRANSFORMERS

T 1	Input Transformer	QLA-0113
T 2	Output Transformer	QLA-0322
T 3	Oscillator Transformer	QLB-0119
T 4	Power Transformer	QLP-0365

## SWITCHES

S 1	Record/Playback selector Switch	ESD-0162
S 2	Power ON/OFF Switch	QSB-0132
S 3	Stop Switch	QSB-0132
S 4	Relay	QSK-0104
S 5	Rewind Switch	QSB-0141
S 6	Rewind Switch	QSB-0141
S 7	Sound Monitor Switch	
S 8	Voltage Selector Switch	QSS-1011

## THERMISTORS

SM	Thermistor TD6-A050	QVM-500A
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## ELECTRICAL PARTS

E 1	Record/Playback Head	WY-011
E 2	Erase Head	WY-209
E 3	Speaker	EAS-9P52S
E 4	Speaker Holder	QKT-1154
E 5	Base Plate Supporter	QLT-1153
E 6	V.U. Meter	QSL-0024
E 7	A. C. Power Cord (with 2 Pin Plug)	QFC-1021

Ref. No.	Description	Parts No.
E 8	A. C. Power Cord Bushing	QTD-1126
E 9	Insulating Paper	QBK-1039
E 10	Circuit Board Assembly	QEI-0083
E 11	Mic. & Remote Jack	QJA-0214
E 12	M-3 Jack	QJA-0110
E 13	R/P Selector Switch Spring (long)	QBT-1136
E 14	R/P Selector Switch Spring (Short)	QBT-1137
E 15	Lug A3	QMQ-1018
E 16	Screw, Round Head M2.6 $\phi$ $\times$ 3	QHM-226 $\times$ 5N3
E 17	Fuse	QJF-1001
E 18	Fuse Holder	QTF-1009
E 19	Voltage Selector Switch Angle	QTT-1222

## MECHANICAL PARTS

M 1	Reel Table Screw	QHQ-1048
M 2	Reel Table Spring	QBS-1016
M 3	Reel Table Washer	QBJ-3025
M 4	Reel Table Assembly	QXP-0117
M 5	Paper Washer 4 $\times$ 8 $\times$ 0.5	QBK-7048
M 6	Screw, Round Head M2 $\phi$ $\times$ 6	QHM-120 $\times$ 6U3
M 7	Screw, Round Head M2 $\phi$ $\times$ 10	QHM-120 $\times$ 10U3
M 8	Flat Washer W2 $\phi$	QWP-2022U3
M 9	Head Adjustment Spring	QBC-1026
M 10	Screw, Round Head M3 $\phi$ $\times$ 5	QHM-230 $\times$ 5U3
M 11	Capstan Holding Screw	QHQ-1032
M 12	Capstan Sleeve	QMS-1090
M 13	Paper Washer 5 $\times$ 8 $\times$ 0.25	QBK-7053
M 14	Stop Ring E4 $\phi$	QNS-404U3
M 15	Flywheel Shaft Metal	QMM-1048
M 16	Pinch Roller Spring	QMN-1050
M 17	Plastic Washer 4 $\times$ 7 $\times$ 0.15	QBJ-3009
M 18	Oil Seal	QBJ-1059
M 19	Pinch Roller	QDP-1053
M 20	Paper Washer 4 $\times$ 7 $\times$ 0.5	QBK-7045
M 21	Stop Ring E3 $\phi$	QNS-304U3
M 22	Pinch Roller Rubber Bushing	QBG-1077
M 23	Pad Arm	QAP-1084
M 23-1	Pad Felt	QAP-1054
M 24	Pad Arm Spring	QAP-1056
M 25	Base Plate Rubber Bushing	QBG-1078
M 26	Tape Counter	QDC-0010
M 26-1	Tape Counter Pulley	QDP-1089
M 27	Counter Spacer	QTW-1028
M 28	Tape Counter Belt	QDB-0047

Ref. No.	Description	Parts No.
M 29	Rubber Cushion for V.U. Meter	QBG-1079
M 30	Screw, Round Head M3 $\phi$ ×8	QHM-230×8U3
M 31	Cam	QMQ-1044
M 32	Lock washer L3 $\phi$	QWG-302K3
M 33	Fast Forward Roller Lever Spring	QBT-1130
M 34	Fast Forward Roller	QDP-1090
M 35	Pulley Lock Spring	QBT-1132
M 36	Sub Fast Forward Lever Spring	QBT-1131
M 37	Paper Washer 3.7×7×0.25	QBK-7036
M 38	Guide Pulley (L)	QDP-1054
M 39	Guide Pulley (S)	QDP-1051
M 40	Fast Forward Pulley	QDP-1091
M 41	Friction Washer	QWQ-1045
M 42	Friction Pulley	QDP--1094
M 43	Friction Spring	QBP-1029
M 44	Plastic Washer 6×8×0.15	QBJ-3006
M 45	Friction Pulley Nut	QNQ-1020
M 46	Paper Washer 5×8×0.25	QBK-7053
M 47	Idler Pulley	QDP-1092
M 48	Paper Washer 5.2×8×0.5	QBK-7065
M 49	Sub Takeup Belt	QDB-0048
M 50	Takeup Belt	QDB-0049
M 51	Supply Pulley Brake Arm	QXL-0064
M 52	Sub Clutch Lever Spring	QBT-1143
M 53	Supply Pulley Brake Arm Spring	QBT-1133
M 54	Supply Pulley	QDP-1093
M 55	Hexagonal Nut N3 $\phi$	QNN-3022U3
M 56	Motor Assembly	QYQ-0032
M 57	Motor Spring	QBT-1139
M 58	Flywheel	QXF-0025
M 59	Flywheel Thrust Steel Ball	QDK-1002
M 60	Screw, Round Head M3 $\phi$ ×4	QHM-130×4U3
M 61	Flywheel Spacer	QNK-1063
M 62	Thrust Steel Ball Retainer	QMQ-1035
M 63	Pinch Roller Lever Spring	QBT-1125
M 64	Clutch Lever Spring	QBT-1064
M 65	Rewind Lever	QXL-0062
M 66	Plastic Washer 4×7×0.15	QBJ-3009
M 67	Rewind Pulley	QDP-1052
M 68	Steel Washer 4×12×0.3	QWQ-1051
M 69	Rewind Rubber Belt	QDB-0025
M 70	Rewind Lever Spring	QBT-1072
M 71	Motor Lifter	QBK-1042
M 72	Cam Plate	QMF-1051
M 73	Record Lock Spring	QBT-1066-1
M 74	Catch Lever	QXL-0024
M 75	Catch Lever Spring	QBT-1134
M 76	Paper Washer 4×8×1.5	QBK-7052
M 77	Fast Forward Lever	QML-1205

#### CABINET PARTS

G 1	Top Cover Case Assembly	QYA-0040
G 1-1	Top Cover Lock Button	QGO-3008
G 1-2	Top Cover Lock Spring	QBP-1059
G 1-3	Screw, Round Head M2 $\phi$ ×3	QHM-220×3U3
G 2	Head Cover	QYR-0049
G 3	Main Case Assembly	QYB-0085
G 3-1	Record Lock Button	QGO-1025

Ref. No.	Description	Parts No.
G 3-2	Record Lock Spring	QBC-1042
G 3-3	Record Lock Lever	QML-1219
G 3-4	Belt Catch	QHQ-1049
G 3-5	Plastic Washer 4.2×8.5×0.2	QBJ-3022
G 3-6	Lock Washer L4 $\phi$	QWG-402K3
G 3-7	Hexagonal Nut N4 $\phi$	QNN-4022U3
G 3-8	Screw, Round Head MS3 $\phi$ ×10	QHV-230×10V3
G 3-9	Side Panel	QYP-0056
G 3-10	Hexagonal Nut N3 $\phi$	QNN-3022U3
G 3-11	Capstan Rest	QMP-1036
G 3-12	Head Cover Pin	QMN-1090
G 3-13	Hexagonal Nut N2.6 $\phi$	QNN-2622U3
G 3-14	Pole	QMP-1078
G 4	Bottom Cover Case Assembly	QYC-0046
G 4-1	Battery Pulling Belt	QFQ-1005
G 4-2	Flat Washer W3 $\phi$	QWP-302N3
G 4-3	Tapping Screw M3 $\phi$ ×6	QHM-530×6U3
G 5	Battery Compartment Cover Assembly	QEO-0006
G 6	A.C. Power Cord Compartment Cover Assembly	QYF-0023
G 7	Hinge	QKC-1013
G 8	Screw, Round Head T2.6 $\phi$ ×10	QHT-226×10V3
G 9	Rubber Washer	QBG-1076
G 10	Base Plate Holding Screw (long)	QHQ-1054
G 11	Base Plate Holding Screw (short)	QHQ-1052
G 12	Base Plate Pole (long)	QHQ-1050
G 13	Base Plate Pole (Short)	QHQ-1051
G 14	Flat Washer W3.5 $\phi$	QWP-3512N1
G 15	Paper Washer 3.1×9.1×0.5	QBK-7039
G 16	Screw, Round Head M3 $\phi$ ×5	QHM-230×5U3
G 17	Knob Holding Screw	QHQ-1055
G 18	Lock Washer L4 $\phi$	QWG-352K3
G 19	Operator Knob	QGT-2025
G 20	Fast Forward Button	QGO-1024
G 21	Volume Control Knob	QGT-1046
G 22	Tone Control Knob	QGT-1047
G 23	Jack Conceal Plate	QGJ-1053

#### ACCESSORIES

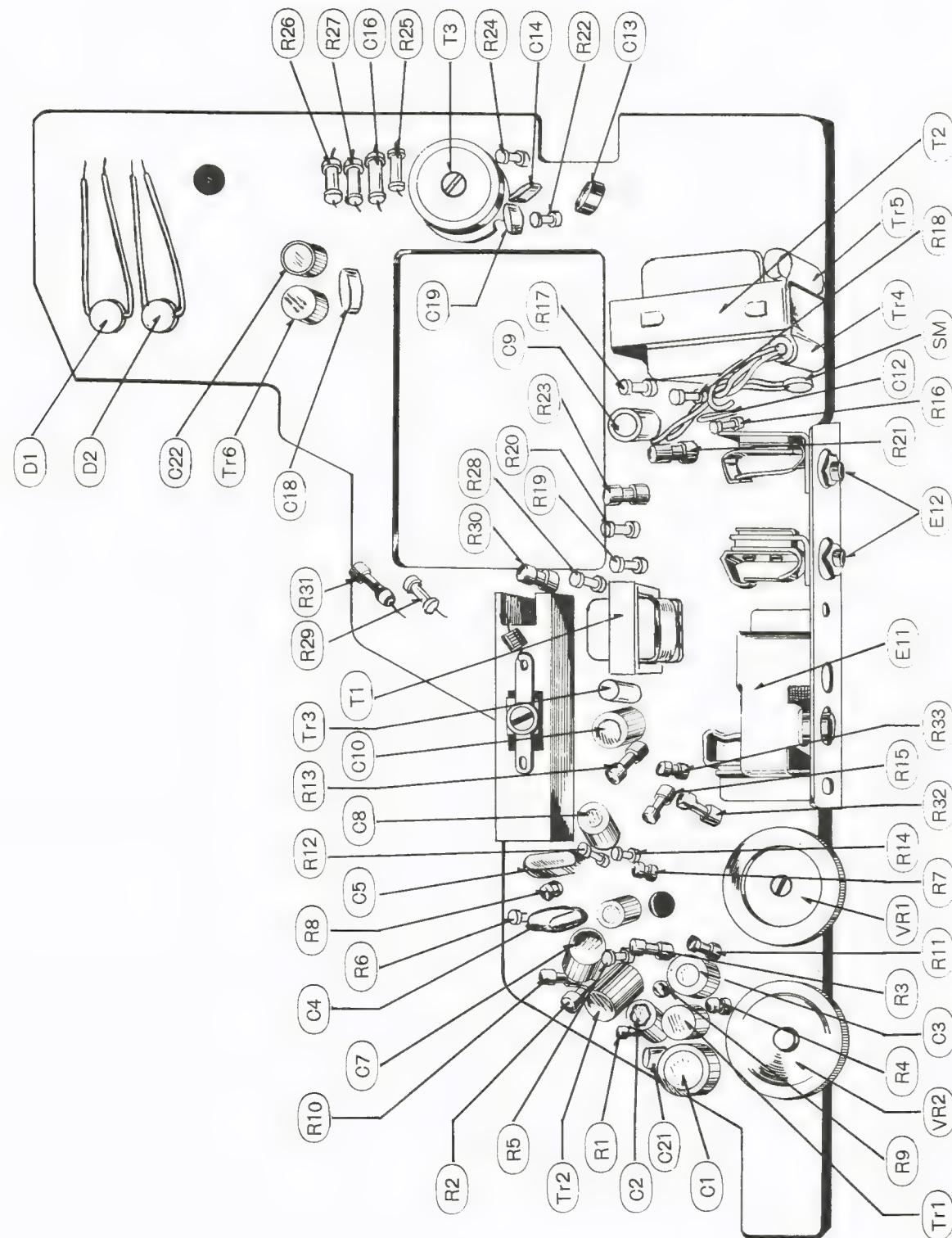
A 1	Dynamic Microphone	WM-2050N
A 2	Accessory Bag	QFK-0010
A 3	Magnetic Earphone	
A 4	2 Pin Plug B	QJP-0910
A 5	Connection Cord-R	QEB-0017
A 6	Hand Belt	QKH-1026
A 7	5" Recording Tape	QFT-5NZ-1
A 8	5" Empty Reel	QFR-5NZ-1
A 9	Splicing Tape	QFS-0002-1
A 10	Instruction Book	QQT-0178

#### PACKING

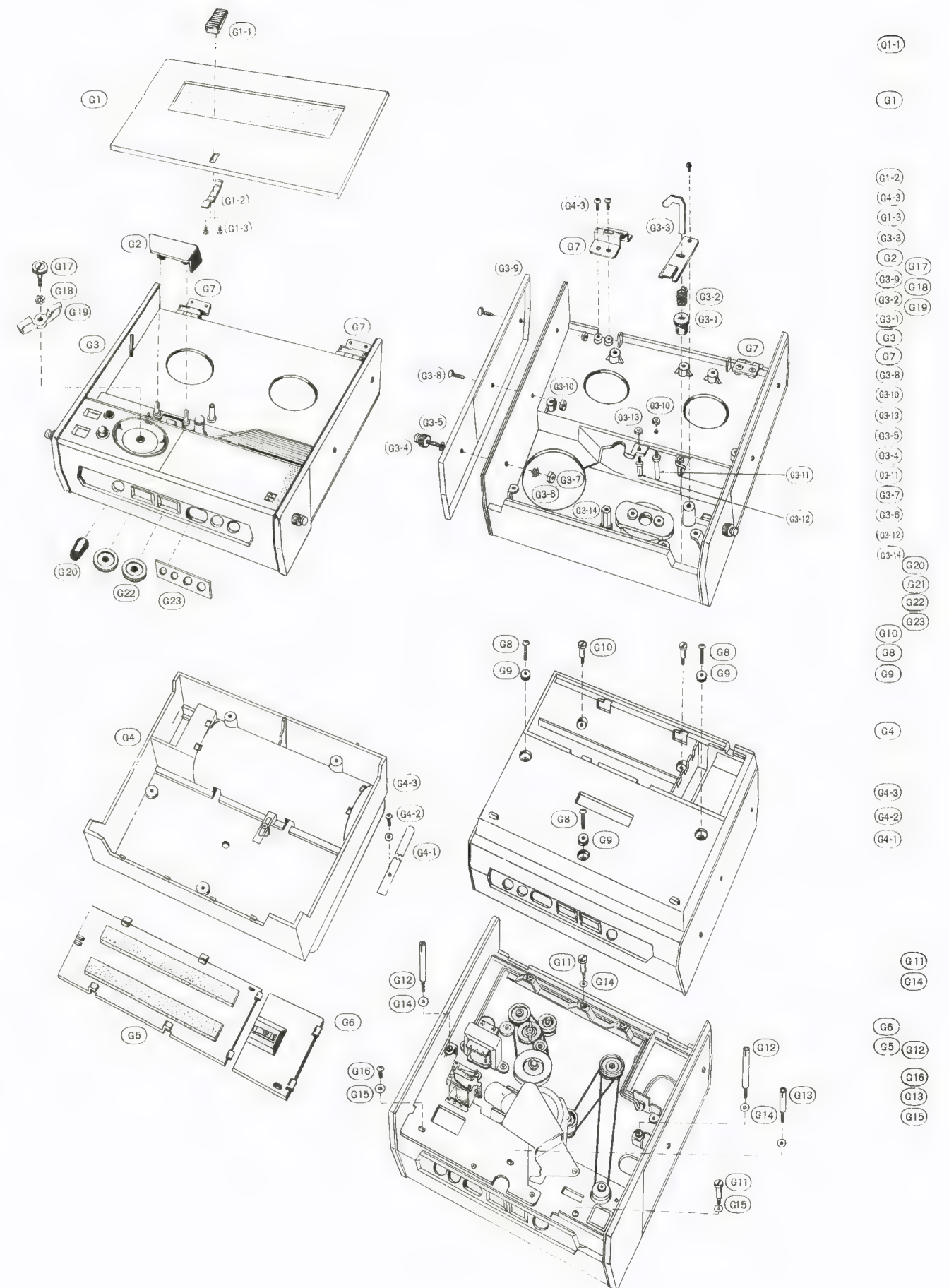
P 1	Packing Case	QPN-1279
P 2	Inner Cushion (L)	QBJ-1126
P 3	Inner Cushion (R)	QBJ-1127
P 4	Dust Cover	QFD-0056
P 5	Accessory Case	QPW-1046



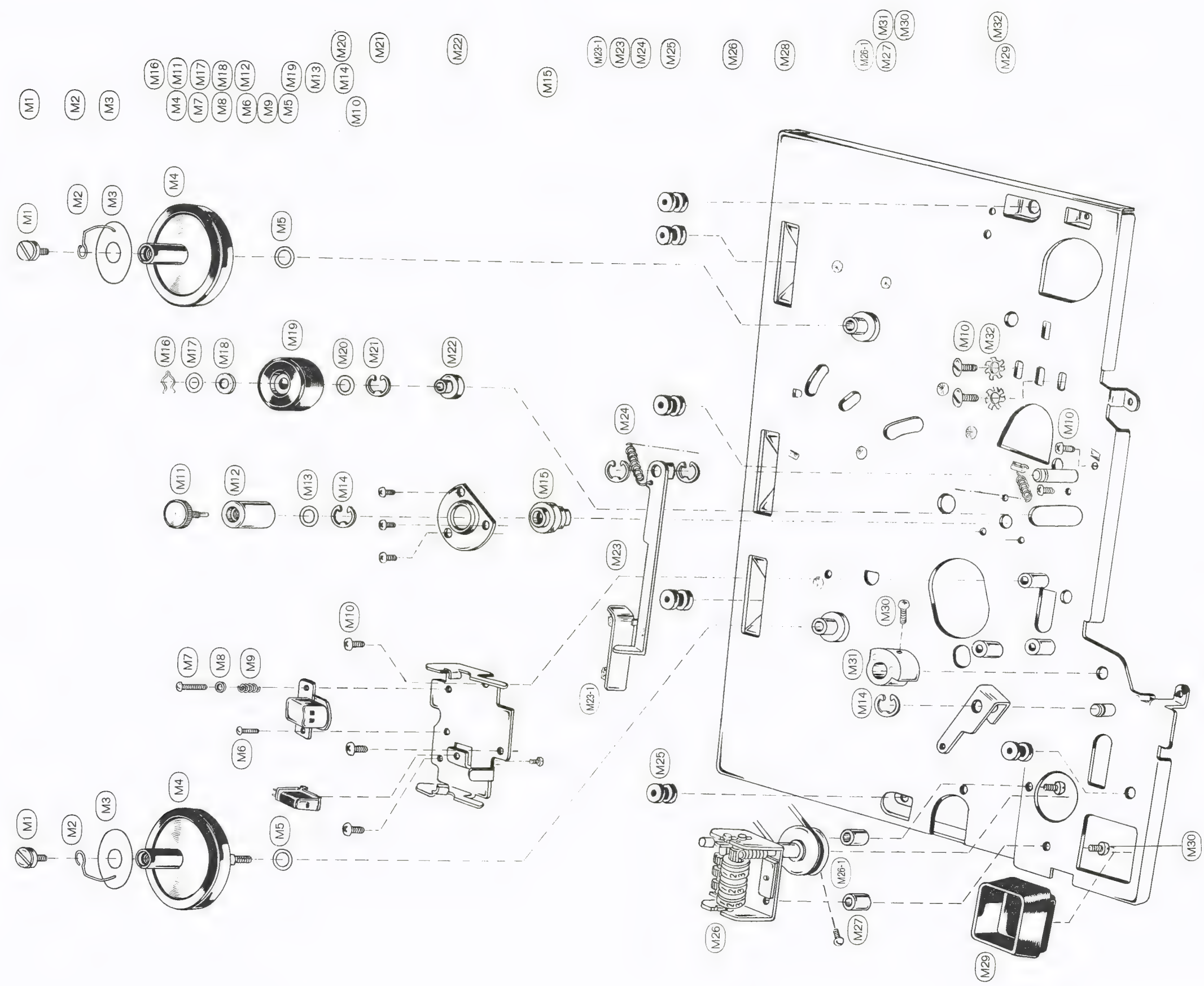
## CIRCUIT BOARD



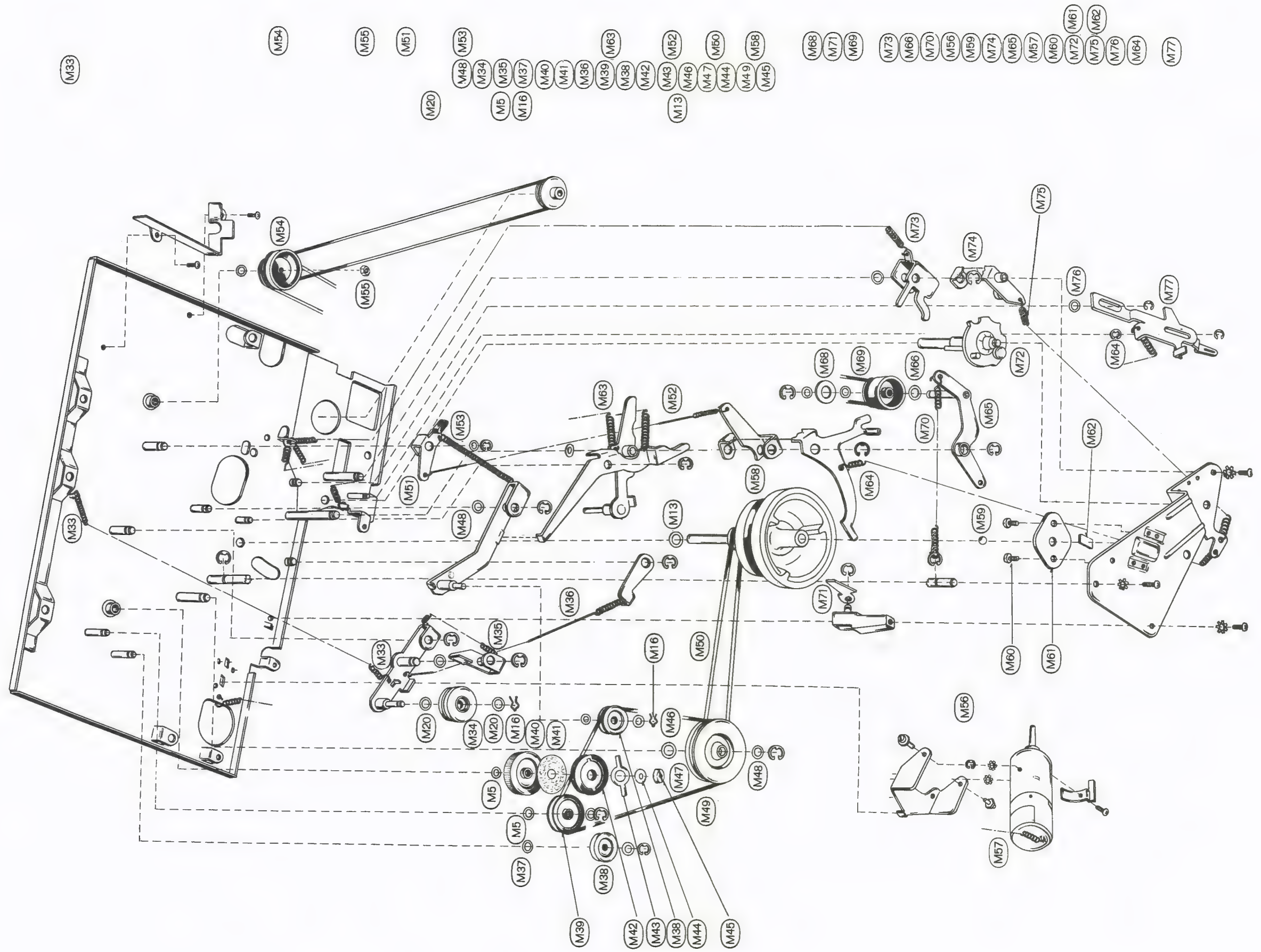
## CABINET PARTS



EXPLODED VIEWS

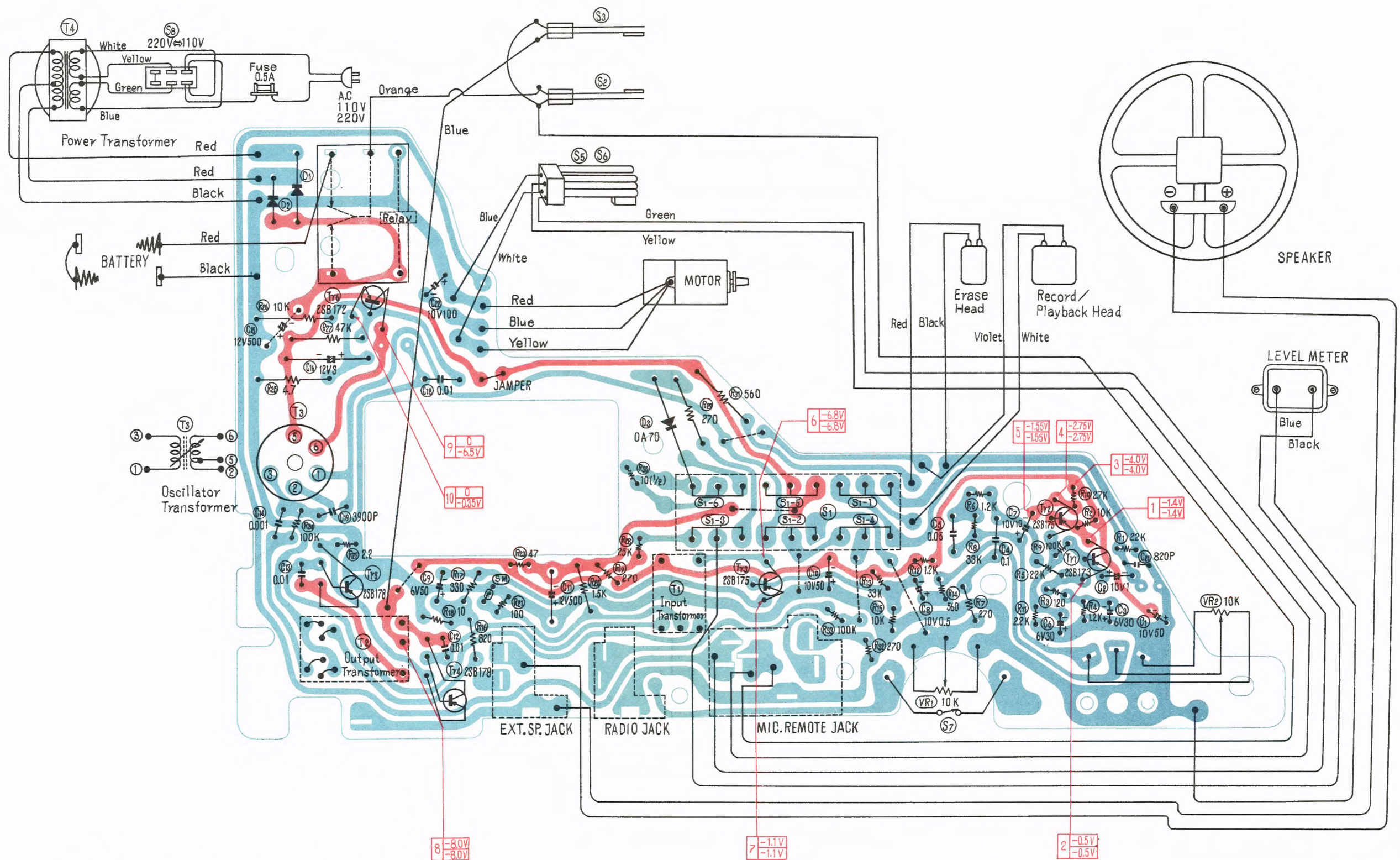








# WIRING CONNECTION DIAGRAM MODEL RQ-152S

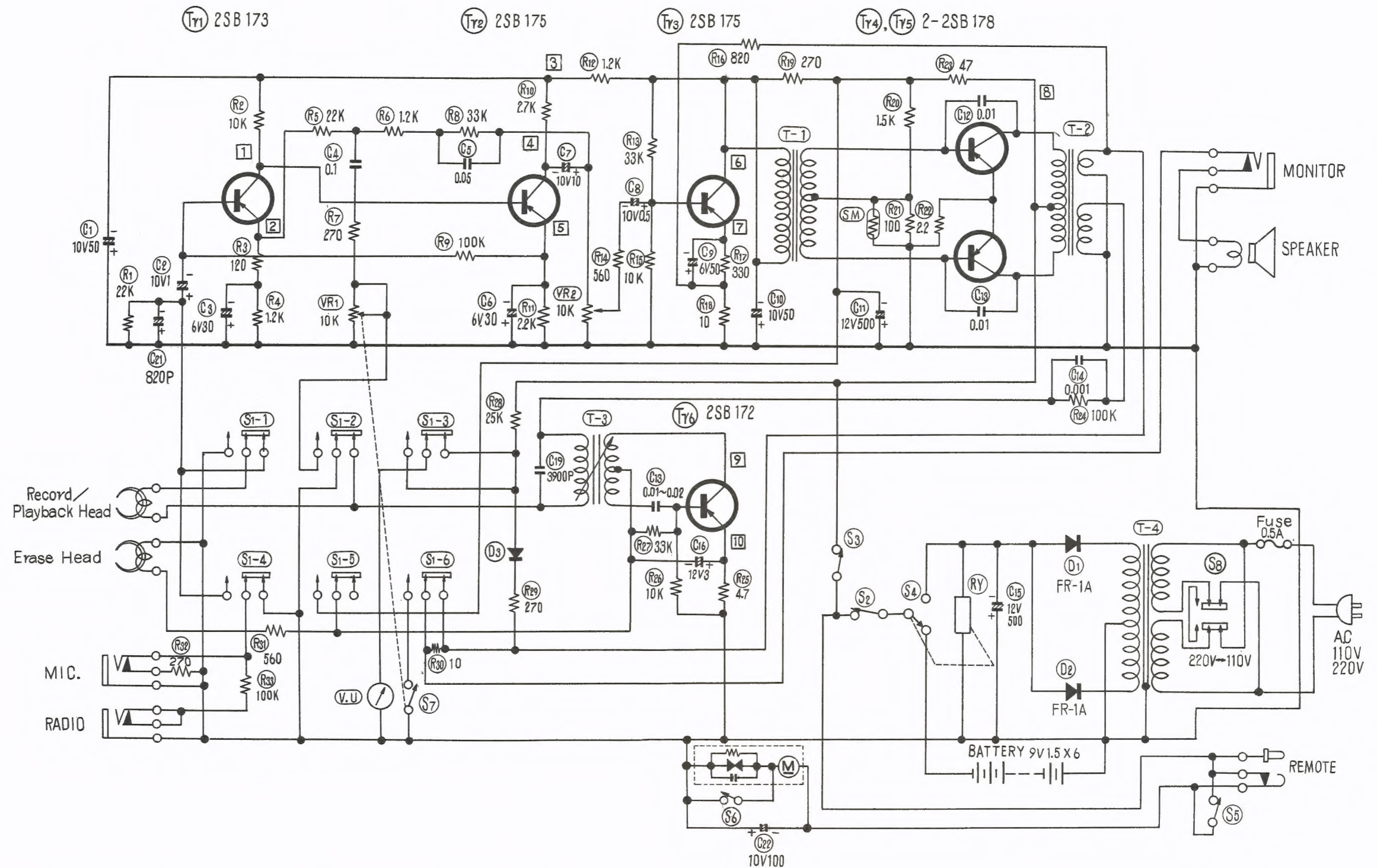


## NOTE:

Values indicated in    are D.C to chassis ground with on signal applied.  
 The upper values should be measured during playback and the lower values during recording.  
 The Circuit shown in red on the Conductor side is B Circuit.



# SCHEMATIC CIRCUIT DIAGRAM MODEL RQ-152S

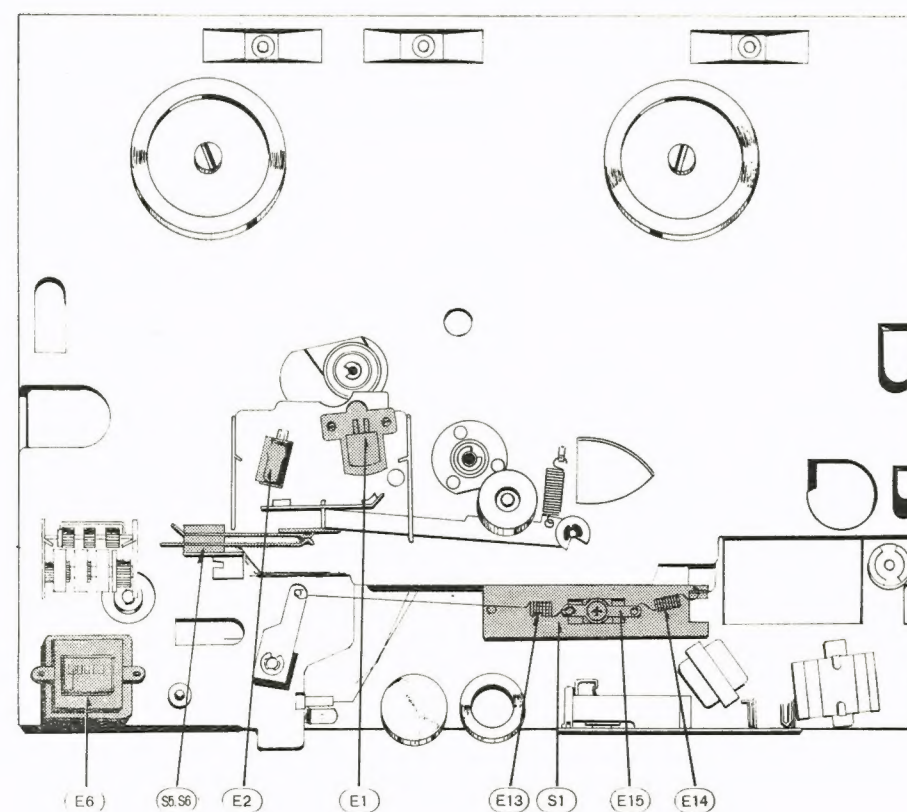
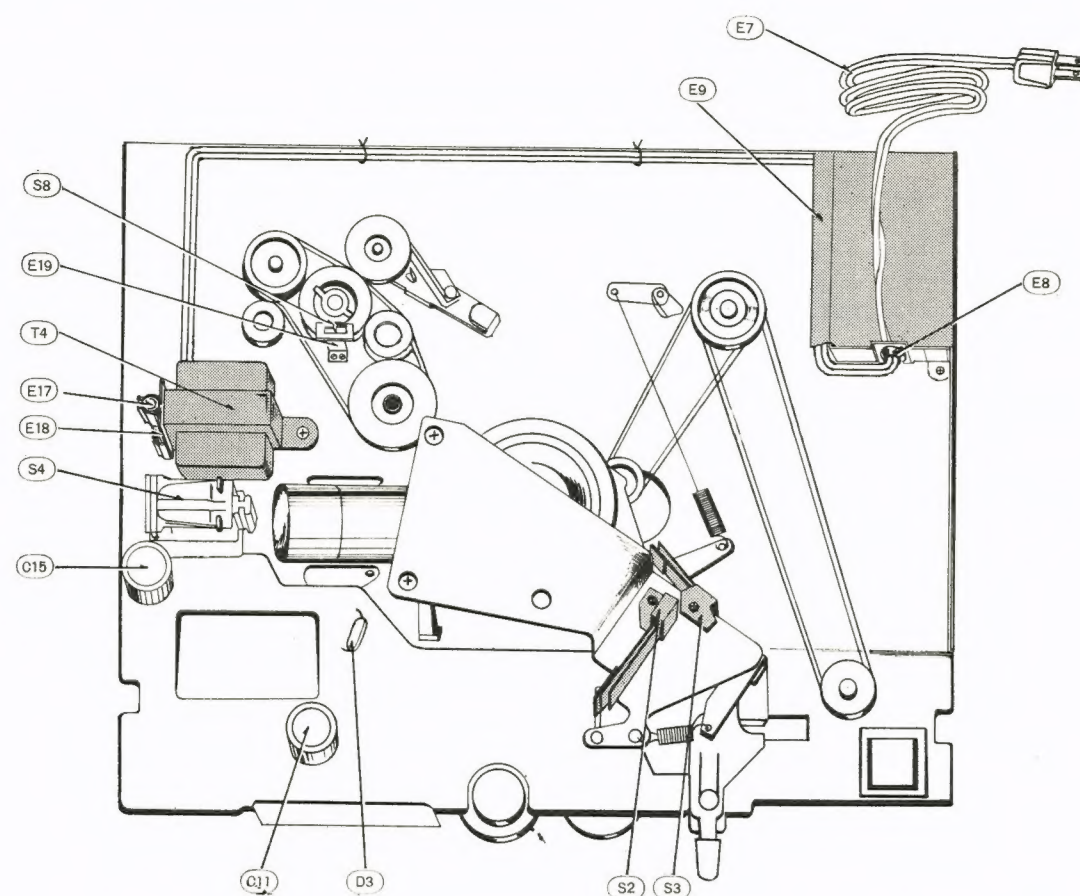


## NOTE:

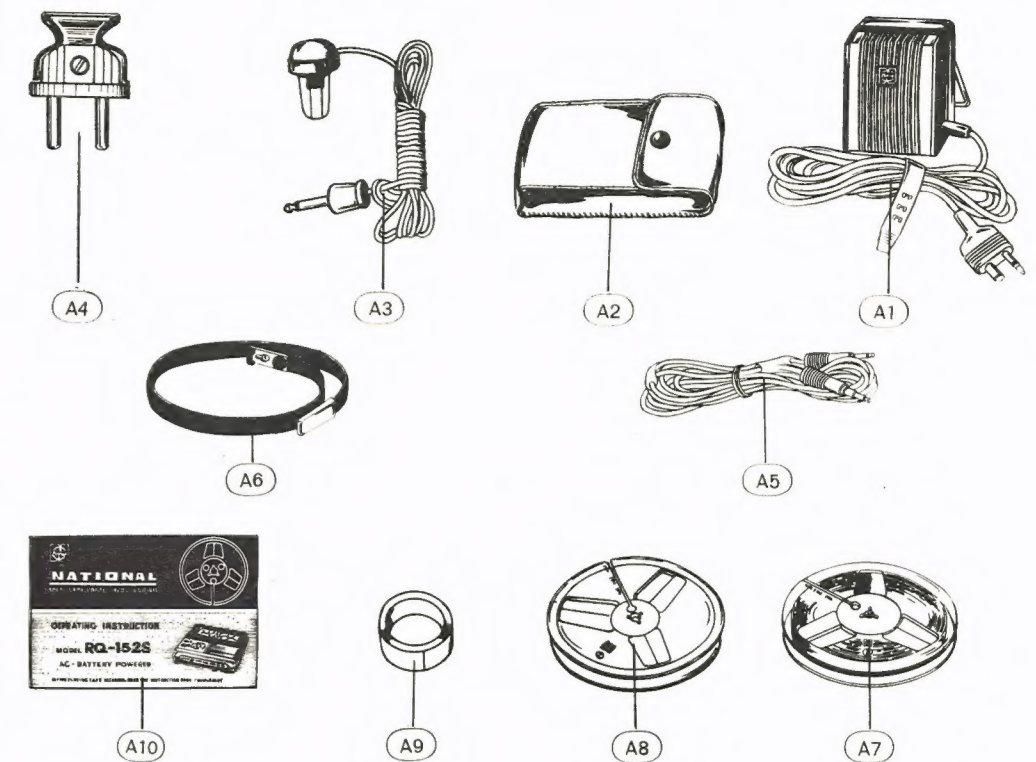
- |   |  |
|---|--|
| T1.....Input Transformer.                     | S4.....A.C D.C Selector Switch.                |
| T2.....Output Transformer.                    | (Shown in Battery position Coupled with Relay) |
| T3.....Oscillator Transformer.                | S5.....Rewind Switch.                          |
| T4.....Power Transformer.                     | (Shown in Playback, Record and Stop position)  |
| S1-1~S1-6 ...Record/Playback Selector Switch. | S6.....Rewind Switch.                          |
| (Shown in Playback position)                  | (Shown in Playback, Record and Stop position)  |
| S2.....Power ON-OFF Switch.                   | S7.....Sound Monitor Switch.                   |
| (Shown in Playback, Record and Rewind)        | (Shown in Sound Monitor ON, Coupled with VR1)  |
| S3.....Stop Switch.                           | S8.....Voltage Selector Switch.                |
| (Shown in Playback and Record position)       | RY.....D.C Relay.                              |



## ELECTRICAL PARTS LOCATION



## ACCESSORIES



## VOLTAGE CHART

Check Point	Voltage in PLAY mode	Voltage in RECORD mode	Tolerance
1	- 1.4 V	- 1.4 V	± 10 %
2	- 0.5 V	- 0.5 V	± 10 %
3	- 4.0 V	- 4.0 V	± 10 %
4	- 2.75 V	- 2.75 V	± 10 %
5	- 1.55 V	- 1.55 V	± 10 %
6	- 6.8 V	- 6.8 V	± 10 %
7	- 1.1 V	- 1.1 V	± 10 %
8	- 8.0 V	- 8.0 V	± 10 %
9	0	- 6.5 V	± 10 %
10	0	- 0.35 V	± 10 %



COMPONENT PACKING

